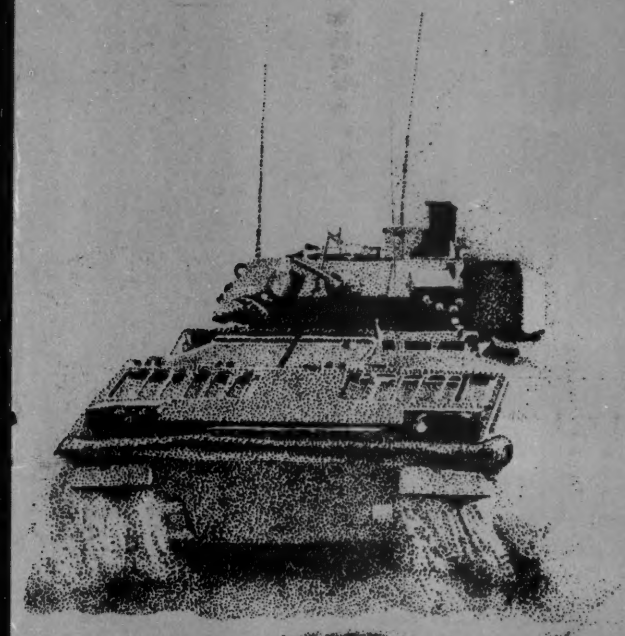
UNITED STATES ARMY
AUGUST 1985

# AVIATION DIGEST

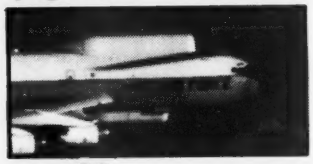
## INFANTRY'S ROLE IN THE MANEUVER ARMS



AUGUST 1985 • VOLUME 31 • NUMBER 8


1 **Army Aviation Pacesetter,** MG Ellis D. Parker
2 **The Combat Aviation Brigade in the Light Division,** MG John William Foss
12 **Views From Readers**
13 **Army Aviation Museum: C-121**
14 **PEARL'S**
16 **The Wrong Guys Are Breaking Helicopters**
20 **ATC Action Line: VFR Flyways Chart Program**
21 **Skyregs Review: Controlled Airspace,** Mr. Barry Schiff
26 **DES Report to the Field: Standardization of Collective Training**
28 **Aviation Personnel Notes: Distribution of DA Form 759—Attention Operations Personnel; Just the Facts**
29 **HOTLINE**
30 **United States Army Reserve Warrant Officer Senior Course**
34 **Automation and Aviation Maintenance,** CPT Richard G. Hatch
36 **ERADCOM—Electronic Warfare Laboratory and Signals Warfare Laboratory—Partners in the Electronic Warfare Arena,** CPT (P) Greg Kaufmann
40 **Kill or be Killed, Part IV: Instructional Features,** CW4 William Yarlett

*page 30*



*page 36*

*page 40*

**Cover:** New equipment, organizational structures such as the 18 divisions in the Army of Excellence and the new air-land battle doctrine present Army leaders with new challenges. Read how Aviation and Infantry will combine their efforts in "The Combat Aviation Brigade in the Light Division." The article begins on page 2.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**Major General Ellis D. Parker**
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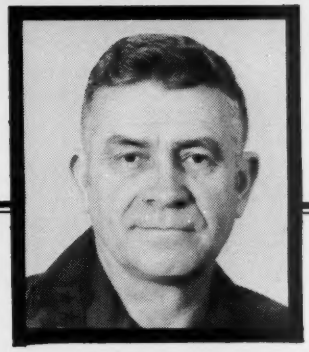


## Army Aviation Pacesetter

The modernization of the Army is a demanding and continual effort which will ensure our ability to fight successfully on tomorrow's battlefield. The mission to ensure that Army Aviation keeps pace with the rest of the force belongs to the Directorate of Combat Developments (DCD).

To accomplish this mission, the Aviation Center continuously, through its mission area responsibilities, identifies the deficiencies that exist in Army Aviation, and targets them for solution by changes in doctrine, training, organizations, or materiel. If a deficiency falls within the organization or materiel area, it comes under the purview of DCD. The directorate has four divisions dedicated to study and analysis, managing the materiel changes that are required, developing, monitoring and maintaining current force structure organizations, and providing user input to the testing and evaluation of materiel. DCD also maintains involvement in doctrinal and training initiatives through close coordination with other appropriate directorates and agencies of the Ft. Rucker Center Team.

Recent efforts of the combat developments process have been manifested in the UH-60 Black Hawk, OH-58D AHIP, and the AH-64 Apache. Since the development of major systems is an inherently involved process, DCD is now planning the next generation of Army aircraft, the Light Helicopter Family (LHX). This program has been in the concept formulation stage for several years under the direction of the Concepts and Studies Division. This division is responsible for providing all of the assigned combat development study functions relating to threat, conceptual studies and analyses, operational and cost effectiveness, war games, and operational and organizational concepts. As the LHX program has continued to develop, it has involved elements of all the divisions in DCD, as well as many outside agencies within U.S. Army Training and Doctrine Command, Army Materiel Command, Headquarters, Department of the Army and industry.

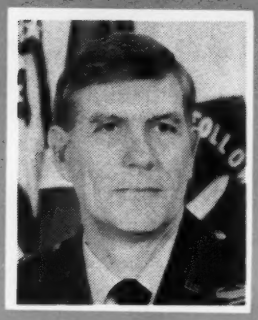
The Materiel and Logistics Systems Division (MLSD), which translates the conceptual ideas of the Concepts and Studies Division into the operational capability requirements documents that are used during the materiel acquisition process, is currently establishing operational requirements for LHX. While this division is participating heavily in the LHX program, a number of other major projects also place demands upon its time and attention. These include enhanced NBC protection, weapons, munitions, aviation life support equipment (ALSE), aircraft survivability equipment, UH-60A command and control ($C^2$) console, CH-47 fleet, night vision equipment and the V-22 (Osprey) to name a few.

The answers to modernizing the force are not always hardware. Sometimes the organization of existing forces or the design of new ones will provide the enhancements required to fight successfully on the modern battlefield. DCD's Organization and Force Structure Division enters the process with the design and development of Tables of Organization and Equipment (TOE). Since the approval of the Army of Excellence design and the establishment of the Aviation Branch in 1983, the division has been responsible for more than 300 separate Aviation TOEs.

Before a system goes into production, or is put into a field organization, it must be tested in an operational environment to determine: does it work; does it work with the soldier in the loop; and, can it be maintained? The Test and Evaluation (T&E) Division plans, coordinates and manages the operational evaluations for Aviation equipment, organization, systems and innovative concepts when an agency within the Aviation Center is the proponent. T&E Division prepares an independent evaluation report of the test report which will also include all other related materiel such as previous testing and studies. The division is currently involved in some 80 programs ranging from the Hind (Mi-24) simulator program to the UH-60 230-gallon crashworthy fuel tanks.

Army Aviation will be prepared to conduct around-the-clock operations on the battlefield of the 21st century. Through the efforts of the Directorate of Combat Developments, the resources will be there to meet that commitment.

# the Combat Aviat



Major General John William Foss
Commander
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# ion Brigade in the Light DIVISION

**Along with Aviation becoming a separate branch came many challenges to successfully employ Aviation, Infantry and Armor as maneuver elements on the modern air-land battlefield. The scene portrays elements of a combat Aviation brigade operating under the operational control of a divisional brigade in a light infantry division and the successful integration of Aviation as a contributing member of the combat arms team.**

TODAY'S ARMY leader faces a multitude of new challenges. These include:

- New equipment as a result of the Army's most dramatic modernization since World War II.
- New organizational structures as the Army moves toward an 18-division force under the Army of Excellence concept.
- New doctrine of air-land battle as outlined in Field Manual 100-5.

Each of these areas of modernization offers particular challenges to the Army Aviation community. To the aviator, new equipment means the UH-60 Black Hawk, AH-64 Apache, AHIP (Army Helicopter Improvement Program) Scout, and eventually the Heavy Lift Helicopter and the Light Helicopter Family.

New organizational structure is most visible in the establishment of the Aviation Branch and the organization of the light infantry divisions (LIDs). The effects of new doctrine are most evident in our continuing efforts to develop tactics for the air-land battlefield.

During the last year, we witnessed great progress in mastering these new challenges; however, the greatest challenge lies in the integration of these three elements into the combined arms team. Employment of a combat Aviation brigade (CAB) in a light infantry division illustrates this challenge.

The light infantry division was designed to be rapidly deployable for the purpose of fighting a low-intensity war or for defusing a potential war. The strength of the light infantry division is "soldier power": highly trained, offensively oriented units capable of bold, independent, decisive action. Light infantry companies maneuver on foot, with limited logistical and self-support equipment. This type of infantry requires innovative logistical concepts. Direct and indirect fire support will be paramount to the success of the light division. The logistical support role of the combat Aviation companies (CAC) will dramatically increase and become equal in priority with air assault and attack helicopter operations.

The combat Aviation brigade headquarters element will provide the division commander with increased potential for planning and executing the full range of both ground and air combat operations. The CAB supports the division by providing the division commander with assets needed to influence the maneuver, combat support or combat service support battle as required. Employment of the CAB as a maneuver headquarters, while viable and feasible, will be of secondary importance. Conversely, the attack helicopter battalion (AHB) normally will operate as a maneuver unit. The CAC will provide combat support and combat service support. These capabilities, when integrated into the division plan, enhance and improve the combined arms team.

The following scenario illustrates the planning and coordination necessary for meeting this challenge: The integration of new doctrine, tactics and training into an effective, Army of Excellence combined arms team. By taking an indepth look at elements of a combat Aviation brigade under the operational control of a divisional brigade in a light division, this article illustrates the successful integration of Army Aviation as a contributing member of the combined arms team.

**Palomas—3 March 19—.**

The morning stillness was broken as the Black Hawks landed at the 2d Brigade support base. They were bringing supplies needed for the upcoming operation. The distance between the division support area and the brigade support base plus occasional ambushes had caused resupply problems for the brigade. However, the combat Aviation companies from the 4th Brigade (CAB) had provided excellent logistical support.

Colonel Sam Johnson, 2d Brigade commander, 21st Light Infantry Division, stood looking at the map board in the brigade tactical operations center (TOC). He had been reflecting on the fact that 3 months ago his brigade had been conducting training back in the United States. Now they were in Palomas getting ready to conduct an air assault operation against the guerrillas. He thought again about the events leading up to the day's activities and how similar this situation was to his experiences 18 years ago as a platoon leader in Vietnam.

Due to a deteriorating military and political situation, the government of Palomas requested and received American security assistance. Palomas had experienced internal instability for several years. The government's plan to hold popular elections in October had caused the externally supported insurgent forces to put forth maximum effort to disrupt the election and discredit its results. As the election nears, the insurgents have increased the level of violence and it appears that they are making an all out attempt to force the government to cancel the elections.

In response to the Palomas government's request, the United States decided to send the 21st LID, as part of a joint task force, to Palomas to assist the government in quelling internal violence so that the elections could be held. The division would augment the Palomas Army and provide the needed additional forces for security operations until the Palomas Army expanded. At the same time the incountry team would organize and train additional paramilitary forces. The division completed an uneventful deployment to Palomas between 6 and 10 January.

The commanding general, 21st LID, directed the 1st Brigade to deploy and conduct offensive operations in the State of Pima. The 2d Brigade assumed the same mission in the State of Sedona. The 3d Brigade was assigned the mission of securing the international airport. The commander also ordered the 3d Brigade to be prepared to provide a reaction force if the 1st or 2d Brigade required assistance. The 1st and 2d Brigades set up support bases in their areas of operations and began to conduct tactical operations with the Palomas Army (figure 1).

Colonel Johnson's thoughts were interrupted as the S2 (intelligence) sergeant informed him that the results of last night's intelligence flights confirmed patrol reports of heavy traffic in the northern portion of the brigade area. Colonel Johnson was excited about the intelligence information.

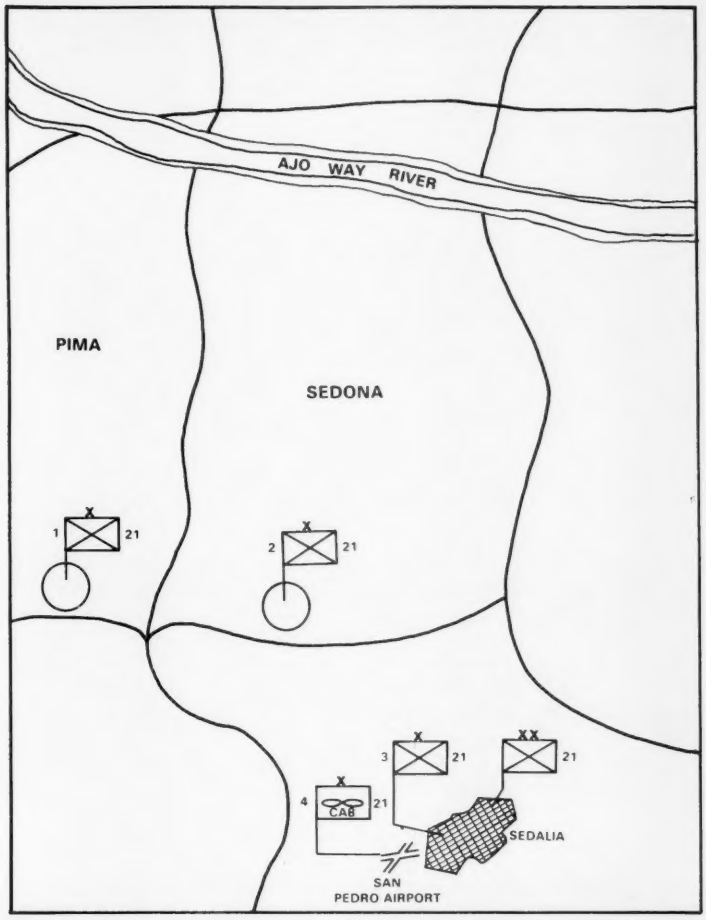
On 1 March, intelligence sources located what they believed to be a guerrilla base camp. These sources stated that the camp was occupied by a unit of 100 to 150 troops armed

with AK assault rifles, RPK machineguns, RPG rocket grenade launchers, SA-7 portable air defense missiles, M60 machineguns, 82-mm mortars and M16 rifles. The enemy's concentration indicated preparation for an offensive operation in several days.

The fleeting target would have to be attacked quickly or the opportunity would be lost. The brigade's demanding predeployment training began to pay dividends. As the brigade staff and the battalions cooperated and preparations ran smoothly and efficiently, Colonel Johnson realized that his command now faced the ultimate test.

Colonel Johnson issued the following planning guidance to his staff: "I want to conduct an air assault to attack and destroy the guerrilla base camp. Plan to use the minimum forces required to accomplish the mission. Plan for a supporting attack by air assault on the north side of the river, where they can block, support or attack, based on guerrilla reaction once the operation is underway. I want to air assault in one lift, if possible. Consider the distance involved when planning fire support. Based on your recommendation, I will request the Aviation support from division."

**FIGURE 1: 21st Division's deployment in Palomas.**




Colonel Johnson realized his request for Aviation support would require the majority of the 4th Brigade's assets. During the discussion with the commanding general, G3 operations and Colonel Charles Thomas, commander of the 4th Brigade (CAB), the commanding general directed Colonel Thomas to provide the requested support. Colonel Thomas, upon receipt of the order, issued a warning order to his combat Aviation companies and the attack helicopter battalion to prepare to support the 2d Brigade's air assault operation. (The AHB commander determines the exact number of attack companies required to support/cover the air assault, based on the recommendation of his liaison officer (LO).) In choosing the air mission commander, Colonel Thomas knew that either of his CAC commanders could do the job. He selected Captain Harry Kline, commander of Company A, because Captain Kline had worked with Colonel Johnson before and because he was more experienced.

Captain Kline determined the essential tasks and made an initial estimate based on the factors of mission, enemy, terrain, troops and time available (METT-T). He issued a warning order and departed, leaving his executive officer to begin preparations. Accompanying Captain Kline was Captain Joe Stevens, the AHB LO. They met Captain John Goodson, the CAB LO at the

2d Brigade. They would operate as a team in coordination with the 2d Brigade commander. Captain Kline would integrate the Aviation forces into the brigade plan as early as possible. By including them in the initial planning, Colonel Johnson would be able to capitalize on the total capabilities of Aviation assets.

Colonel Johnson began to plan for the operation. He considered the troops to be lifted, the lift assets and the proper employment of those lift assets. Based upon his estimate of his battalion commanders, Colonel Johnson selects Lieutenant Colonel Bo Dobbs, the 1st Battalion commander, to be the air assault task force commander (AATFC). He knew Lieutenant Colonel Dobbs' battalion was prepared for this operation.

After receiving the brigade staff estimates, Colonel Johnson stated his decision: "Based on the intelligence, I have decided to conduct the operation with one battalion, the 1st Battalion. The 1st Battalion commander will be the air assault task force commander. The CAC will be under the operational control of the 1st Battalion for the air assault, then revert to my control. The 2d Battalion will provide a reaction force of one company to be prepared to implement OPLAN GREEN, which I will outline in a moment. The 2d Battalion (minus) will be prepared to support either the 1st Battalion's operation or OPLAN GREEN as necessary. The 2d Battalion commander will be the AATFC for either operation that requires the 2d Battalion (minus). One company of the 3d Battalion will provide security for the support base. The 3d Battalion (minus) will conduct company size patrols to the east and west along the border. These will be feints to mislead the guerrillas as to our intent.

"Now, I want to discuss how I see this operation. It is my intention that the 1st Battalion make simultaneous air assaults into landing zones (LZs) PICK, BLADE and SHOVEL, to quickly isolate, encircle and destroy the guerrilla base camp. Intelligence photographs show two major trails, one east and one west, leading into the base camp. We will want to ensure they are blocked. The attack helicopter battalion will cover the two major trails on the north side of the river. We should trap any force that is in the camp between the 1st Battalion and the AHB (figure 2).

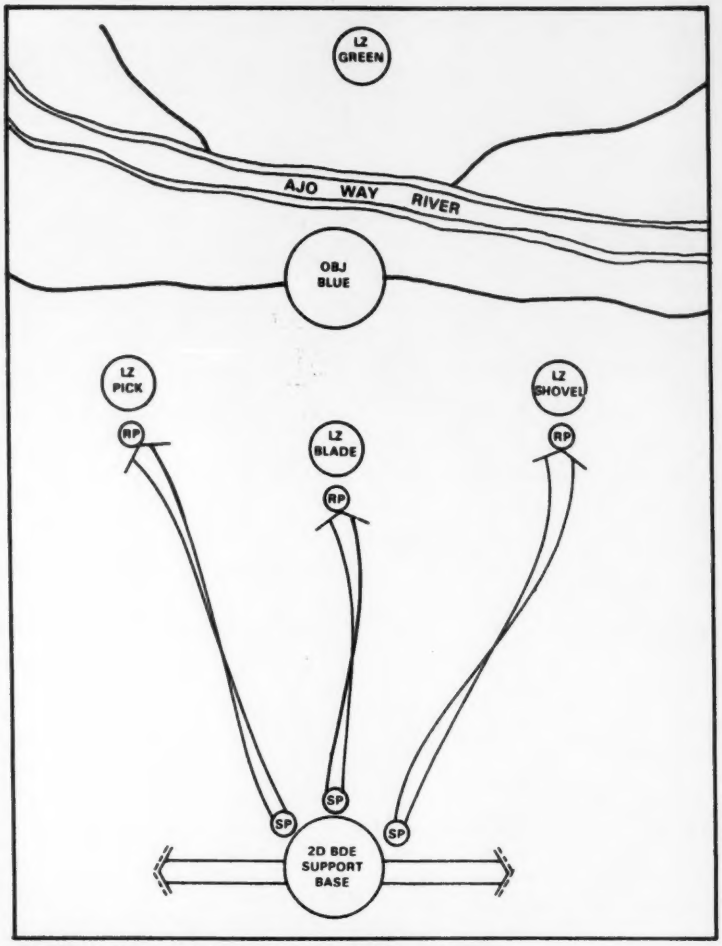



**FIGURE 2: Colonel Johnson's concept of the operation.**

"As a contingency, I want one company from the 2d Battalion to be prepared to conduct an air assault into LZ GREEN, on the north side of the river. This will be OPLAN GREEN. Captain Stevens, ensure your commander gets this portion of my plan. The AHB commander, Lieutenant Colonel Ray Willis, will be the AATFC for OPLAN GREEN. He will be on the north side of the river and familiar with the

situation. At this time I don't see a need for a force any larger than a company north of the river. Using feints, the 3d Battalion must make the enemy think we are operating along the border. Intelligence reports indicate no current enemy activity along the border, but I want you to be prepared for enemy contact."

Lieutenant Colonel Dobbs begins planning for the air assault by coordinating with his staff, the air mission commander (AMC) and the AHB LO. At the staff meeting he gives the following planning guidance: "We will be conducting an air assault to seize Objective BLUE, which is the guerrilla base camp. I want to ensure the two major trails, to the east and west, are blocked. Brigade has selected the LZs for us. We have the lift capability to insert all three companies at one time. Captain Goodson, the Aviation liaison officer, is here to assist us, along with Captain Kline, the AMC, and Captain Stevens, the AHB LO.

"Captain Stevens, consider using the attack helicopter unit in two ways: first, as protection for the insertion and second, to overwatch from positions north of the Ajo Way River. This will prevent the enemy from using the river as an escape route. I want to use multiple landings as part of our deception plan. I want the south bank of the river designated as a restrictive fire line. S3, I want you to work closely with the attack LO on this. Also, I want you to include the reaction force in your planning. Make sure you coordinate with the 2d Battalion on the reaction force."

Captain Kline and Captain Stevens return to the 4th Brigade for a detailed planning session with their Brigade S3 and Major Smith, the commander of the other combat Aviation company. Captain Stevens coordinates establishment of a forward arming and refueling point (FARP) in the brigade support area to provide for a rapid turnaround if required. A small maintenance team from the 4th Brigade also will be at the FARP to assist in troubleshooting minor difficulties. Captain Kline explained to Captain Stevens: "Colonel Johnson plans to use Lieutenant Colonel Willis as an AATFC, and Lieutenant Colonel Dobbs wants to cover the insertion, plus the overwatch positions. I suggest you place one company OPCON (operational control) to me for the assault. Then Lieutenant Colonel Willis can take the other two companies north of the river. I will release the attack birds as soon as I can and they will be available to support the others."

While Captain Kline and the 4th Brigade staff were developing their portion of the staff estimate, Captain Goodson remained at the air assault task force TOC to continue coordination with the battalion staff. The staff uses the reverse planning sequence for an air assault operation to ensure completeness. Captain Kline and the battalion staff jointly present the staff estimate to Lieutenant Colonel Dobbs and his company commanders. The staff estimate covers such topics as: information on allowable cargo load, pickup zone (PZ) location, time, security, marking, control, flight route to the PZ, and landing formation and direction. Also considered are: air movement, including primary and alternate routes; start points (SPs) and release points (RPs); formations and airspeed; attack helicopter missions; deception measures; and the air movement table.

*The landing plan considered:*

- Fire support and suppression
- CAC unit tasks
- Primary and alternate LZs
- Location of the LZ and the time of landing
- Formation and direction
- Deceptive measures
- Abort criteria.

*Coordinating instructions considered:*

- Downed helicopter procedures
- An aircraft load bump plan
- A weather decision by 1-hour increments
- Weather abort time.

The estimate also covers such critical information as:

- Ammunition and fuel requirements
- Turnaround time from the FARP to the objective area
- Special aircraft equipment
- Medical evacuation
- The command and signal plan.

After considering the staff estimates and recommendations, Lieutenant Colonel Dobbs gave his decision: "Our mission is to air assault, to attack and destroy the guerrilla base camp, located vicinity coordinates _____ at 050530 Mar 19____. This will be a coordinated, deliberate attack with Company A on the left, Company B in the center making the main attack and Company C on the right.

"According to the latest intelligence reports, the base camp is not fully developed and we can use surprise to our advantage. The initial reports caused us to believe the camp was a staging area for the guerrillas to launch an attack. We now believe it will be used more as a training camp. In either case, we are going to attack and destroy it. We will insert Companies A and C in LZs PICK and SHOVEL to set up blocking positions across the major trails leading out of the camp. Company B will go into LZ BLADE and attack to the north to seize Objective BLUE.

"I want to use the attack

helicopter unit in two ways," Lieutenant Colonel Dobbs said. "First as protection for the lift ships and second to overwatch from positions north of the Ajo Way River to prevent the enemy from using the river as an escape route. I want a group of targets planned as a time on target (TOT) on the objective following the assault. We want to achieve maximum surprise and effect by using the TOTs. Other targets must be planned on escape routes and in support of the AHB. Plan on a dedicated airborne fire support officer to support the AHB. The south bank of the river is designated as a restrictive fireline" (figure 3).

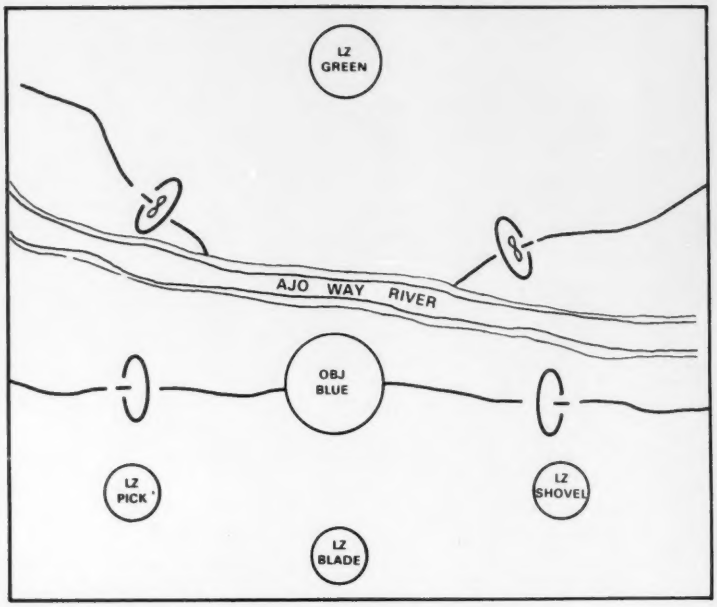



FIGURE 3: Lieutenant Colonel Dobbs' concept of the operation.

**Early morning, 5 March 19—.**

At H-30, the last aircraft lands in the designated pickup zones. The pickup operation begins before beginning morning nautical twilight with filtered PZ lighting and night vision goggles for both Aviation crews and Infantry leaders. The battalion completes loading at H-28 and all aircraft depart the PZs along the designated flight routes, where the attack helicopters join them.

The low light conditions, terrain flying techniques and flight route selection ensure that the flights are unopposed. The landing of all three rifle companies occurs at H-Hour. The attack helicopter elements cover the insertion and establish blocking positions on the north side of the Ajo Way River.

Captain Kline, returning with his elements to the designated PZs to stand by for additional lifts or mission changes, ran into problems. The deception plan called for multiple landings to deceive the guerrillas. Shortly after takeoff from the final LZ, the last aircraft was hit by ground fire. As the pilot called that his aircraft was damaged, Captain Kline realized that a group of guerrillas had camped in the LZ. The guerrillas evidently were en route to the guerrilla base camp. Captain Kline, reacting quickly, turned to follow the damaged aircraft. The pilot told Captain Kline that he was going to have to land. The aircraft landed hard and began to smolder. Captain Kline picked up the crew and as they lifted off, the downed aircraft began to burn. Captain Kline made a note of the grid coordinates for the recovery crew (figure 4).

Companies A and B have little trouble in moving into position and establishing their blocking positions. However, Company B, under the command of Captain Dan Mack, experienced some difficulties in its advance. The trail the company had planned to use faded out about 50 meters from the LZ. Captain Mack's lead element quickly located a faint trail leading in the right direction. His plan was simple. The lead platoon would attack through the camp and seize Objective BLUE 2, followed by the other two platoons, one turning left to seize Objective BLUE 1, and one right to seize Objective BLUE 3. His intent is to split the camp and drive the enemy toward the friendly blocking positions (figure 5, page 10).

Major Raul Vargas, the acting commander of the guerrilla base camp, sits in his hut drinking a cup of coffee. He sullenly thinks of the radio message received last night. His superiors are furious that the camp is not completed. Why can't they send him more experienced workers, he wonders, recalling that all he has is raw recruits. If only his superiors would listen to him. But no, they, who have all the plans, don't consider the work necessary to accomplish the plans and they continue to pressure him to get the camp completed.

He was concerned that the camp

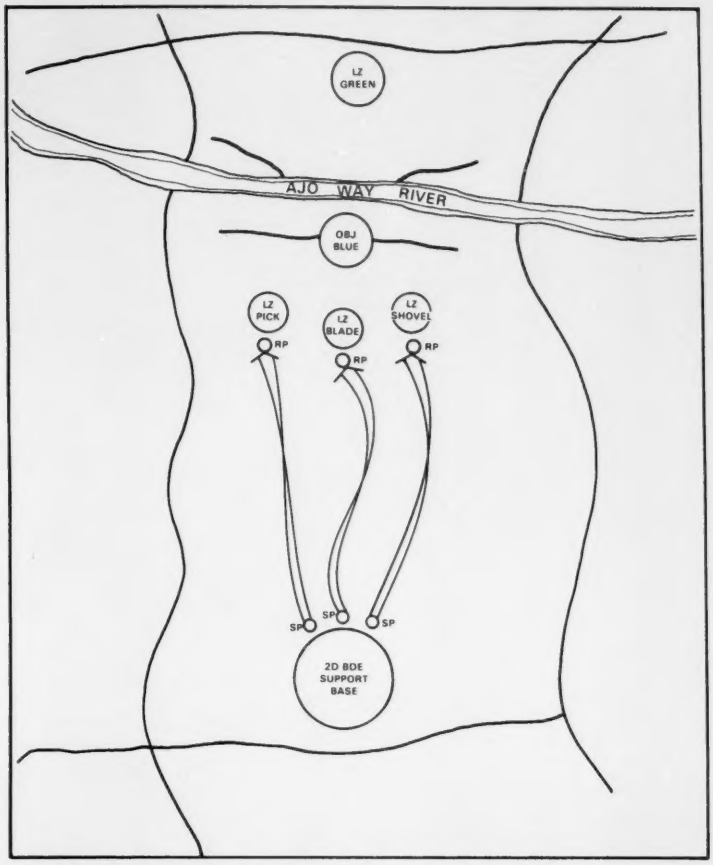



**FIGURE 4: 1st Battalion's operation plan.**

would not be finished when the new camp commander arrived to begin the first training cycle. The camp, he thought, was not situated in the right place. It was too far from the towns, and he lacked enough boats to use the river effectively. Major Vargas wondered why his superiors didn't consider these things in their planning. The idea of conducting actual guerrilla operations as a part of the training was good, but he felt it would take too long from their present location. Why couldn't he, for once, be a planner? He would show them how things should be done. Disgusted, he threw the cup across the room and stood facing the doorway.

At that moment the camp erupted with impacting explosions, which were closely followed by intense machinegun fire and attacking infantry. As Major Vargas ran out the door, he realized, with his last breath, that they had been discovered. The camp was in utter confusion, and the majority of the veterans were out of the fight within minutes of the initial assault.

**More soldiers and equipment when they are needed—where they are needed, via UH-60 Black Hawks.**

Captain Mack was pleased with the precision of the operation as the platoons of Company B maneuvered through the camp. Some of the surviving guerrillas quickly headed for the jungle surrounding the camp. He reports the fleeing guerrillas to Lieutenant Colonel Dobbs.

While monitoring the action, Colonel Johnson realizes that additional ground forces are needed on the north side of the river to close the trap. He directs Lieutenant Colonel Willis to execute OPLAN GREEN.

The AHB commander, Lieutenant Colonel Willis, contacts the commander of Company A, 2d Battalion and informs him of the situation on the north side of the river, giving him the following guidance. "Establish platoon size blocking positions on the minor trails vicinity coordinates _____, _____ and _____. Block these trails and engage any guerrilla forces that succeed in crossing the river. Pickup time will be 0730" (figure 6).

Company A is picked up and inserted into LZ GREEN as planned. Troops in the blocking positions capture 16 suspected guerrillas as they attempt to cross the river. There are no veteran guerrillas in the group, only recruits. At 1100 hours the brigade commander, based on situation reports received from Lieutenant Colonels Willis and Dobbs, determined that Company A, 2d Battalion, was no longer needed in its present positions and ordered Captain Kline to extract it.

At 1115 hours Lieutenant Colonel Dobbs ordered his three companies to reorganize in their present positions on the south side of the river. He ordered Companies A and C to conduct patrols to locate and engage any remaining enemy in the area, while Company B was to set up a defensive position and consolidate the captured equipment and supplies from the base camp for evacuation. The units evacuate their wounded. Lieutenant Colonel Dobbs releases the Aviation units to brigade control and requests an air resupply of ammunition and other critical items from brigade to support the continuing operation. He plans to evacuate the captured equipment and supplies on the returning resupply aircraft.

The battalion was successful in destroying an enemy base camp and capturing not only personnel and equipment, but also important documents that would further assist in the elimination of the guerrilla threat to the area. The success of this mission was a result of proper planning, coordination and use of ground and air assets.

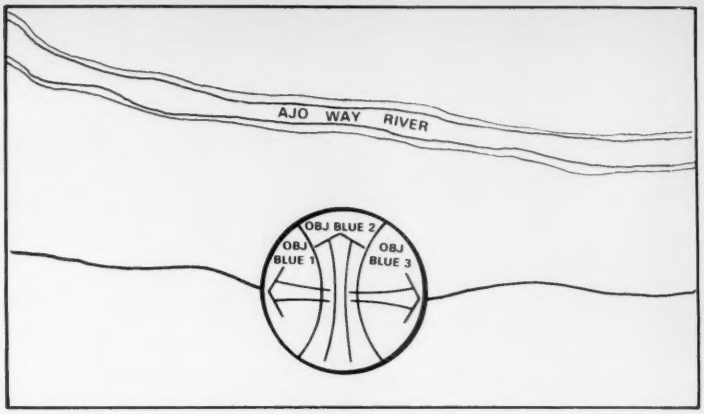



FIGURE 5: Captain Mack's operation plan.

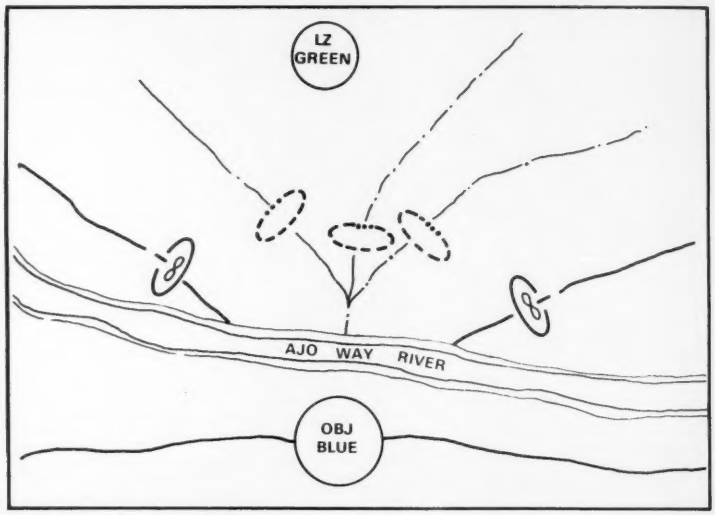



FIGURE 6: OPLAN GREEN.

**Late afternoon—5 March 19—.**

Colonel Johnson, in the brigade TOC, began making notes on the day's activities. He wanted to ensure all the lessons learned were included in the after action report. He felt the operation was successful.

The brigade and battalion staffs had performed well. He noted that the AMC, Aviation LO and the AHB LO had provided his staff with invaluable guidance on the use and capabilities of the combat Aviation brigade. He was pleased with the support the Aviation unit had provided. Lieutenant Colonel Willis had executed OPLAN GREEN with precision, and his attack aircraft had provided excellent fire support. As he thought of the Aviation units, he made a note to visit Colonel Thomas to thank him for the excellent support and to get his reports on the operation.

Colonel Johnson remembered a comment Captain Kline had made. One squad had difficulty unloading in the landing zone. It had appeared to Captain Kline that they were confused about where to go after leaving the aircraft. Colonel Johnson made a note to consider additional training in unloading and action drills upon unloading the aircraft.

Colonel Johnson settled back in his chair as his S3 approached to discuss the operation. He thought again of the successful operation and how pleased he was with the brigade's performance.

This scenario illustrates the role played by the combat Aviation brigade in the light division combined arms team. It represents an operation that could occur tomorrow with current equipment and organization. Using the equipment and doctrine that is being produced and published today, we can be better prepared than ever before for the challenges we face. And, working together as a combined arms team, we can fight and win any battle.

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Last month the *Aviation Digest* covered the challenges of combining Armor, Infantry and Aviation forces into a single fighting maneuver arms team with the lead article, "Attack Helicopter Operations on the Heavy Battlefield," by Major General Frederic J. Brown, chief, Armor Branch. Next month the series concludes with "The Challenges of Winning," by Major General Ellis D. Parker, chief, Army Aviation Branch. Last February, Major General John S. Crosby, chief, Field Artillery Branch, covered fire support of the combat Aviation brigade in "Field Artillery and Army Aviation." A copy of this article and Major General Brown's article can be obtained by writing to Editor, *Aviation Digest*, P.O. Box 699, Fort Rucker, AL 36362-5000, or by calling AUTOVON 558-6680 or FTS 533-6680.

**The capacity and ability of UH-60 Black Hawks will provide commanders with more effective and responsive air assault.**

# VIEWS FROM READERS

Editor:

I need your help to locate former members of Army Aviation CV-2 Caribou and U-1A Otter Aviation companies. A few former members of these companies met recently in Columbus, GA, and expressed a desire to organize an association, which we hope will eventually lead to a reunion of former members of these Aviation companies.

I have been asked to write to you to see if you would print the following information.

**Former Army members of Caribou and Otter Aviation companies interested in forming an association are requested to contact Sam Pinkston at 1145 Watson Drive, Columbus, GA 31907. Phone number: 1-(404)-563-1264.**

LTC William G. Hooks (Ret)
6813 Brewster Drive
Columbus, GA 31904
Phone # 1-(404)-324-1596

Editor:

This letter is in response to the article in *Aviation Digest* (Jan 85), DES Report to the Field. I found it most enlightening and long overdue. I am an IFE/SIP and the operations officer at AASF #1, Los Alamitos, CA, ARNG. We currently operate 31 OH-58A aircraft and the situation related in the article is alive and well in southern California. In addition, we have one of the busiest en route structures in the United States, so the problem of conducting the hands-on portion of the instrument flight evaluation is compounded. I might add, we do not have an SFTS in this area, so all training must be accomplished in the aircraft.

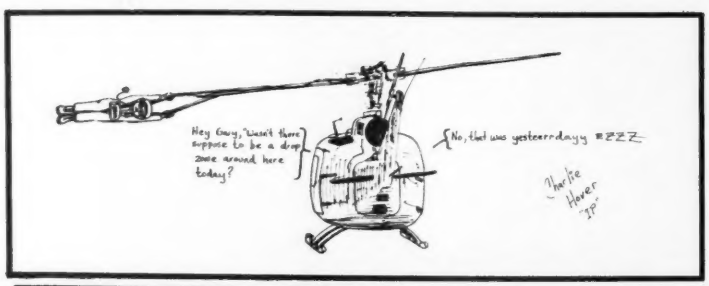
The requirements for an instrument flight evaluation outlined in the ATM and AR 95-1 must be met. To accomplish this, the "traditional" hands-on portion of the checkride is nearly impossible to complete in this area. The key phrase in reference to the article is one that I had adopted several years ago. The only time an OH-58A aviator will be IMC is in an "emergency situation." Taking this into consideration, and still conscious of the requirements of FC 1-215 and AR 95-1, I have created a situation for the OH-58A aviators that they, in all likelihood could find themselves in, completely by surprise. There have been several occurrences where an OH-58A aviator has gone inadvertent IMC while alone and has lost control of the aircraft. This was due to not only the stress of the situation, but also pilot overload (e.g., frequency, transponder code and heading and altitude changes in rapid succession).

To emphasize this probability I use a simulated mission to our tactical training area. I then put the pilot in a simulated VHIRP and tell the pilot he is alone, inform him that he just entered IMC conditions, then sit back and observe. I play ATC "inside" the aircraft to add realism to the scenario. I've found this to be very effective because I can see firsthand how an aviator might react in an emergency situation. Of course, the real stress will not be there, but I can still debrief on what should or should not have been done.

I deliberately overload the aviator to see how he will react, to include emergency panel, and believe me I see a variety of solutions and not all of them IAW our facility SOP. After the VHIRP, the approach that was not selected by the pilot, holding and the other mandatory requirements are accomplished. I might add we are fortunate to have a GCA facility here and an NDB w/NDB MAP holding to aid in this scenario.

Since adopting this scenario I have found the aviators get a stark realization of how much task overload can take place if they do not take control of the situation (i.e., inform ATC of an emergency, take only one instruction at a time, and always put the aircraft and their own safety first, and ATC second). In addition, I spend extra time during the oral examination with OH-58 pilots in order to cover some of the en route procedures they are unable to experience during a traditional flight evaluation and again I have found this to be very successful. Thanks for the article, I think it will help many OH-58 A/C IFEs.

1LT Daniel J. Nelan
CA ARNG
Supervisory Flight Instructor




*Articles from the Aviation Digest requested in these letters have been mailed. Readers can obtain copies of material printed in any issue by writing to: Editor, U.S. Army Aviation Digest, P.O. Box 699, Ft. Rucker, AL 36362-5000.*

GOAL—
$2,500,000
AUGUST 1985—
$1,640,000
cash and pledges

# Army Aviation MUSEUM

*This is a series about the Army Aviation Museum Foundation fund drive. Currently, plans call for building a modern complex to house your Army Aviation Museum. Since last month additional donations have been received. However, we still have a ways to go, as the barometer above shows. If you would like to help "build" the Army Aviation Museum's new home, you are invited to send a tax deductible contribution to: The Army Aviation Museum Foundation, Box 610, Ft. Rucker, AL 36362-5000. If you desire additional information call Mr. Ed Brown at (205) 598-2508.*

## A Look At What's In Your Museum

**The first Lockheed C-69 (example), later designated C-121, flew on 9 January 1943. There were 22 C-69s built before the military contract was terminated after V-J Day. In 1948, the USAF ordered 10 examples of the L-749 series, designating them C-121. However, because of their intended use by Military Air Transport Service for long-range VIP missions, upon delivery nine were redesignated VC-121A "Constellation." Of the nine, one was "Columbine I," used by General Dwight D. Eisenhower, NATO commander. Another was "Dewdrop," used by General Hoyt Vandenberg, USAF commander and most notably the "Bataan" (48-613) used by General Douglas MacArthur, Supreme Commander, Allied Forces in the South Pacific. After being used throughout the South Pacific and upon returning General MacArthur to the United States in 1951, Bataan was based in Hawaii until around 1959-1960 when it was placed in storage at Davis-Monthan AFB, AZ. In 1966, NASA acquired the Bataan, stripped the VIP interior out, added a strengthened honeycomb floor and installed the telemetry equipment for the Apollo 11 capsule. The aircraft flew the orbital path of the Apollo 11 capsule around the world 11 times testing the telemetry equipment. In 1970, this aircraft was transferred to the Aviation Museum.**

# PEARL'S

## Personal Equipment And Rescue/survival Lowdown

Sue Rodriguez

**Potential Hazard Alert**

The following is a reprint of U.S. Army Medical Materiel Activity (USAMMA) message 291920Z May 85.

A. SGMMA-LDT-Q-0879, 281920Z Jul 83, SAB.

1. The National Institute for Occupational Safety and Health (NIOSH) has advised this agency that the following medical materiel should be discontinued from issue and use immediately.

| NS | NOMENCLATURE | MANUFACTURER/ SERIAL NUMBER |
|---|---|---|
| 6515NS | 4500 PSI/DOT-E 7235 | Luxfer USA Ltd. |
| 6515NS | Hoop-Wrapped Alumi-num Cylinders | All Serial Numbers |

REASON. NIOSH has been informed by the manufacturer that the above cylinders may rupture and crack.

NOTE 1: Materiel is used in Medical Safety and Health Administration (MSHA)/NIOSH certified self-contained breathing apparatus.

NOTE 2: Materiel will bear the cylinder manufacturer's name (Luxfer) or the name of the manufacturer for the self-contained breathing apparatus (Scott or Use/Survivair) and the serial number.

NOTE 3: Name and/or serial number may appear on a label under the outer layers of wrapping and/or stamped in the metal on the cylinder dome. Materiel should have a steel neck ring installed which is designed to prevent the possibility of sudden rupture of cylinder when it is pressurized to 4,500 PSI.

2. CONUS and overseas activities with the above materiel that has not been fitted with a steel neck ring, should immediately contact Luxfer, USA, Ltd., 1995 Third Street, Riverside, CA 92507, (714) 684-5110 to obtain information or installation of that ring.

3. It is urgent, to prevent such rupture from occurring, that every 4,500-PSI/DOTE-E 7235 cylinder in use, or being stored for future use, be fitted with this ring. Hydrostatic test stations may not accept unfitted cylinders for hydrostatic testing. The cylinder without a neck ring cannot be used as part of an MSHA/NIOSH-approved self-contained breathing apparatus after 1 September 1985. Do not pressurize a 4500-PSI/DOT-W 7235 cylinder above 4000 PSI until after the neck ring is installed.

4. This item is not cataloged under a management control number as reflected in the Army Medical Department catalog of nonstandard medical materiel or a national stock number.

5. Request you pass this information through command channels to medical staff sections, post safety/supply officers, medical maintenance personnel and supported activities.

6. USAMMA will confirm this information in DA SB 8-75 series.

*Editor's Note: The message on page 14 applies to firefighting and other related fields that use self-contained breathing apparatus. Please pass along to those support personnel.*

**Cold Weather Survival School**

Through the past few years the Army has been involved in exercises in Egypt, Honduras and other hot weather environments. With the recent emphasis on hot weather training and survival in a desert-type environment it should be noted that there are many cities and countries north of 45 degrees latitude that could be the scene of conflict, training or survival. The 45-degree parallel runs across the United States in a line from Maine through New Hampshire, Vermont, New York, southern Canada, Michigan, Wisconsin, Minnesota, South Dakota, between Montana and Wyoming and through Idaho and Oregon. A big portion of Europe is north of the 45th parallel and so is most of Russia. Greenland and Iceland both are completely above the parallel. So you see there is still and always will be a need for cold weather survival training. Major Michael Hayes, CW4 Jerry Chapman and SSG Martin Hyde of the 88th Army Reserve Command (ARCOM) recognized the need for cold weather survival training. They began a program in 1980 and have continued this training up to the present. Each year in January they sponsor 4 classes of 30 personnel each. Attendees come from the U.S. Army Reserves, the National Guard, the Active Army and even Department of the Army civilians. The course is conducted near Ely, MN, about 200 miles north of the Minneapolis/St. Paul metropolitan area and 4 to 6 miles south of the Canadian border. The course is 4 days in length, beginning at 0800 hours on the first day with classes on the proper techniques of survival. The following 2 days are spent on a field exercise where you will have an opportunity to use military survival equipment, build your own shelters, and learn to exist in a very cold environment. The 88th ARCOM will provide an information sheet on all required equipment and other administrative matters.

The instructors for the course come from the 3612th Combat Crew Training Squadron (CCTS), Fairchild Air Force Base, WA 99011. Last year's instructors were TSGT Herbert P. LeBeau II and Senior Airmen Keith Kunkel and Stephan Ganyo. The program of instruction is the same as that used in the U.S. Air Force Arctic Survival School at Eielson Air Force Base, AK, and 6th U.S. Army.

For further information on class dates for 1986 and allocations for the course, contact Major Hayes, CW4 Chapman or SSG Hyde at the 88th U.S. Army Reserve Command, Ft. Snelling, St. Paul, MN 55111, or call AUTOVON 825-5642 or Commercial (612) 291-0131.

**FM 1-508-1**

For those of you who have been waiting for it, FM 1-508-1, "Maintaining Aviation Life Support Equipment (ALSE)—Maintenance Program," has been published effective 24 May 1985. This is the first in a series of six manuals to be published regarding ALSE. The other manuals are:

| | |
|---|---|
| FM 1-508-2 | "Maintaining Aviation Life Support Equipment (ALSE)—Personal Equipment" |
| FM 1-508-3 | "Maintaining Aviation Life Support Equipment (ALSE)—Flotation Equipment" |
| FM 1-508-4 | "Maintaining Aviation Life Support Equipment (ALSE)—Survival Equipment" |
| FM 1-508-5 | "Maintaining Aviation Life Support Equipment (ALSE)—Medical Equipment" |
| FM 1-508-6 | "Maintaining Aviation Life Support Equipment (ALSE)—Oxygen Systems and Related Equipment" |

*Editor's Note: These are publications that are scheduled for printing. Upon print, they will be distributed automatically via pinpoint distribution and will not be available for requisition from the U.S. Army Adjutant General Publications Center, Baltimore, MD, until indexed in DA Pamphlet 310-1.*

**Change of AUTOVON Numbers**

I refer you to the PEARL's article in the April 1985 issue of *Aviation Digest* entitled "Suspension System for Aviator Use Wearing the AN/PVS-5 Night Vision Goggles." The AUTOVON prefix for Aberdeen Proving Grounds, MD, has been changed from 283 to 298. This change has been effective since approximately May of this year. Thanks go to those who have brought this to our attention.

***If you have a question about personal equipment or rescue/survival gear, write PEARL, AMC Project Officer, ATTN: AMCPO-ALSE, 4300 Goodfellow Blvd., St. Louis, MO 63120-1798 or call AUTOVON 693-1218/9 or Commercial 314-263-1218/9.***

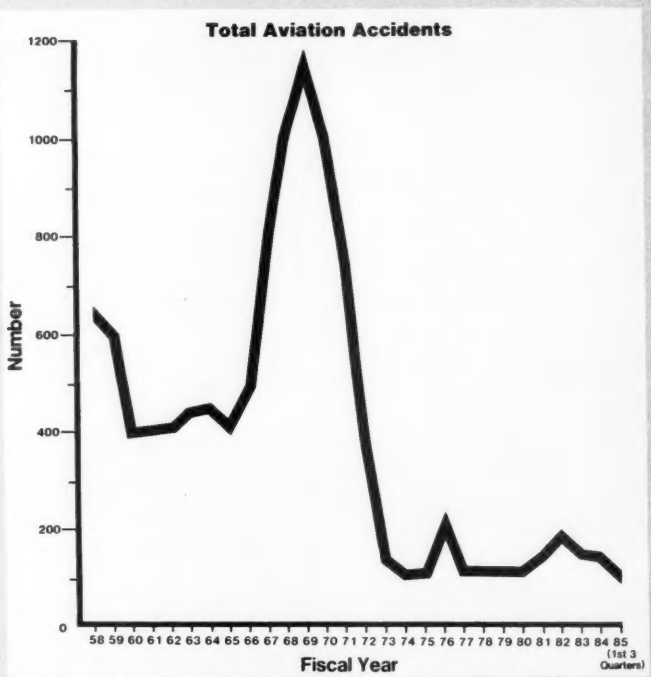
# The wrong guys are breaking helicopters

***As the newly designated commander of the Army Safety Center, I recently had the opportunity to participate in the FORSCOM Aviation Safety Workshop held at Fort Rucker. I heard General Don Parker's opening remarks about the need for disciplined aviators and close supervision of aviation operations. General Parker's point that the wrong guys are breaking helicopters is right on target, and I've asked him if I could share his views with you.***

***Colonel Terence M. Henry***
***Commander***
***U.S. Army Safety Center***

U.S. ARMY SAFETY CENTER

**While the total number of Army Aviation accidents has come down and the rates are lower, the dollar cost has risen. The average cost of an accident in 1958 was $13,000. With the introduction of the Black Hawk and S Model Cobras into the inventory the average cost of equipment alone in a Class A accident today is $1½ million, a figure that is sure to rise as the Apache comes on line.**



**safety viewpoint by**
**Major General Ellis D. Parker**
**Commanding General**
**U.S. Army Aviation Center**
**and Fort Rucker**

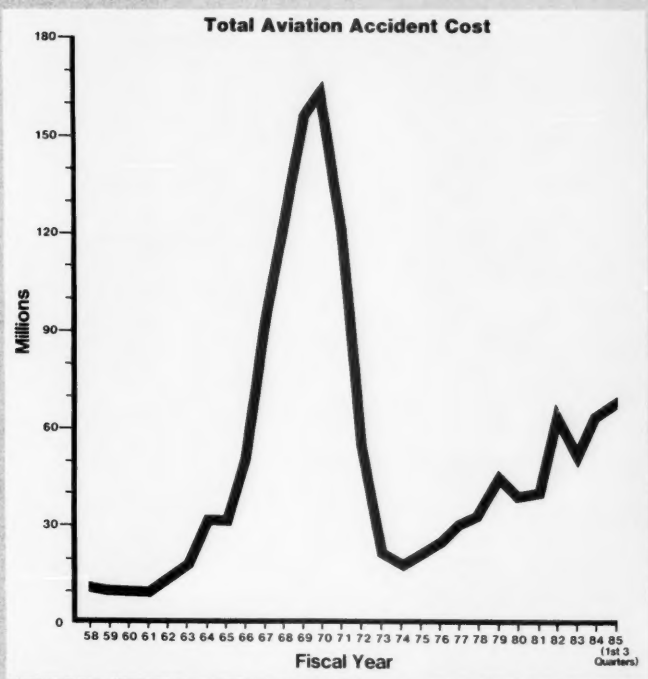
To understand where we are today in aviation safety, we have to go back and take a walk through the history of Army Aviation safety. The first year we collected Armywide aircraft accident data was the year I graduated from flight school, 1958. That year the Army's aircraft accident rate was 54.3 major accidents per 100,000 flying hours. That was the rate the year I joined the 101st Airborne Division. The 101st's rate was even higher than the Army's worldwide rate that year. When I think back on the philosophical approaches I heard from some of the Aviation commanders I worked for at that time, I'm amazed that our rate wasn't higher.

Before 1958, we did not have our act together safety-wise. We had learned little or nothing from the Air Force about managing an Aviation safety program. But in 1958, the Army started doing a lot of things to improve its Aviation safety. One was to start a formal safety course at the University of Southern California to train Aviation safety officers. In-depth research into accident causes and prevention was also started.

These and other improvements eventually cut that 54.3 rate by more than half. It took a lot of years to get the rate down to 26—I can remember that milestone because it was a major accomplishment. And it took a few more years to get below 22. I also remember that because of its significance to all of us in Army Aviation.

To put all of this in perspective, the highest Armywide Class A accident rate we have had in the last 6 years is 3.49, and that was considered a bad year. True, we have changed the criteria for classifying accidents over the years, but it's still an apples-to-apples comparison. So picking up on the Virginia Slims commercial, "We've come a long way, Baby." We have truly made a lot of progress.

So why, then, all the emphasis on improving safety in Army Aviation when we have made that kind of progress? The reason is that we have broken between 37 and 50-plus aircraft every year for the past 6 years. These broken aircraft have cost us between $40 and $57 million and an average of 30 to 35 lives in each of those years. And aircraft costs continue to go up. We will soon be flying aircraft that cost close to $8 million a copy. We are already flying $5 million aircraft.



Back in 1958, most of our aircraft were in the $16,000 to $34,000 price range.

I recently had the privilege of presenting the Safety Unit of the Year Award to a National Guard battalion that is spread over two states, including California from one end to the other. That unit had been accident free for 5 years and had flown more than 50,000 hours. Its members flew their flying hour program; they met all their ATM training requirements for individual aviators; and they met their collective unit standards by passing ARTEPs.

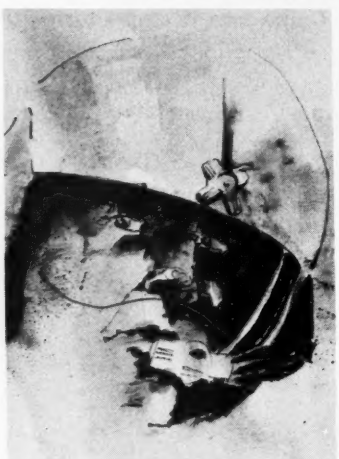
There are other units in the Active Army, the Guard, and the USAR that have gone between 3 and 11 years without bending or breaking an aircraft, and they've done it using the same cut of hardware and the same cut of people. Truly, they are being all they can be. Many of the rest of us are not.

I don't think we can flip a switch and say, "Thou shalt never have another accident," and be able to make it stick. But when we have units that can go that many years accident free, it's time to pause and take stock and ask ourselves, "Am I being all I can be?"

**Who's not breaking helicopters?**

**It's not the guys in flight school.** Year after year, we get youngsters coming into the flight program who, just a few nights earlier, were causing their fathers some concern about using the family car. We put these kids in a TH-55, and eventually we transition most of them into the Huey and some of them into the OH-58 or Cobra or Black Hawk or CH-47. And then we send them out to field units where they perform admirably. This may sound like I'm boasting, but let me assure you that I'm not—I haven't been at the Army Aviation Center long enough to boast about anything. The credit for what I am about to tell you precedes me and my predecessor and his. The accident rate at the Army Aviation Center, where we're putting these youngsters through this training process, has historically been one or less Class A accident per 100,000 hours. And we've done this in spite of the fact that we fly almost a quarter of the Army's total flying hours. I think that's significant.

**It's not the guys in multiship formations.** When we start looking at where aircraft are being broken and under what conditions, it is uncommon indeed to find one broken during the inherently hazardous multiship formation mission. This is



true even though these guys are flying missions day and night with their skids just above the treetops.

**It's not the guys flying slingloads.** Although you might find it hard to believe, it is rare that anyone breaks a helicopter while flying with a heavy slingload, whether it be a Black Hawk or Huey or CH-47.

**It's not the guys taking checkrides.** At Fort Rucker, we have a Directorate of Evaluation and Standardization (DES) whose people visit every major command every year to evaluate aviator performance. They sample the entire Aviation population. They look at the guy right out of flight school who has recently joined his unit and how the unit is sustaining him. They look at the guy who has somewhere between 650 and 2,500 hours, the aviator who has started to acquire some air sense and some moxie. And they sample oldtimers like me. So recently I asked the DES commander to go back and see how many years it had been since someone had broken an aircraft during an evaluation checkride, a very demanding checkride that puts aviators—the youngster, the midstream guy, and the oldtimer alike—through all their ATM requirements. He had to go back 10 years before he found a case—and it turned out to be a relatively minor accident resulting in Class C damage.

**Why are these guys not the culprits?**

The guys who are not breaking the helicopters have a lot in common. All we have to do is look closer at the conditions under which they fly to find the common thread.

DES evaluation checkrides are conducted in a very structured environment. The DES folks begin with a detailed briefing and require a back-brief to ensure complete

understanding of exactly what is about to take place. And they have the magic pen on the guy. The aviator clearly has an incentive to "be all he can be." He's going to be graded. His boss is going to find out whether he is a good, bad or indifferent aviator. So what does he do? He goes out and proves that he's pretty damn good.

Is there a relationship between the DES checkrides and the Class A rate of one or less per 100,000 hours here at the Army Aviation Center? I think there is. Instructor pilots and student pilots are challenged to be all they can be. Again, someone has the magic pen on them. The student pilots perform in a closely supervised and structured environment. They are briefed on what is expected of them, and they execute according to plan. They are graded on their performance, and they are held accountable for their actions. And the IPs are judged on the basis of their students' performance. Again, there's the challenge to be all they can be. And they're doing it.

Now let's look at multiship missions. While there's nobody on board grading the pilot, he still feels challenged to be all he can be. In this case, it's peer pressure. His professional competence is being judged by those around him. And he's not about to do something dumb in front of his peers. The same holds true during heavy slingload missions. The pilot knows he has no margin for error, and he doesn't go out and fool around. He plans his mission in great detail and goes out and executes according to plan—even though no one's grading him.

**The wrong guys are breaking helicopters. . .the most proficient guys of all. . .it has to do with complacency, overconfidence and a lack of professional self-discipline.**

In all of these scenarios, the aviator is challenged to be the best he can be; and he meets that challenge.

**So who IS breaking the helicopters?**

Historically, human error has been a cause in 70 to 80 percent of our Class A aircraft accidents...and in more than 40 percent of those accidents involving human error, the aircrew willfully violated established procedures. But the record shows that it's not the young aviators who are violating the procedures. They're still apprehensive. They don't believe they're as good as we've told them they are. They still have doubts about that, and they're not about to go out and do anything dumb. And it's not the oldtimer. He knows he's not as proficient as he used to be, so he takes no chances. It's the most proficient guy, the 650- to 2,500-hour guy who's gotten overconfident and cocky, who goes out on a single-ship mission, out from under supervision, and decides to deviate from established procedures.

I think the accident data today clearly points out that the wrong guys are breaking helicopters—the most proficient guys of all, the ones we would least expect to wreck an aircraft. And it has to do with complacency, overconfidence, and a lack of professional self-discipline.

An analysis of human-error-related accidents shows that 86 percent of the recommended corrective actions during the past 4½ years have been targeted at improving direct supervision of flight operations by unit commanders.

I know from experience that commanders cannot be present in every cockpit, and once the aircraft is off the ground, the pilot is on his own. But I also know that while each commander cannot be physically present in every cockpit on every flight, his presence can be felt in that cockpit. His presence would be the attitude and professional atmosphere that he has established through his own example and the requirements he has placed on his aircrews to "be all they can be."

***From the Safety Center perspective, if we can get to that 40 percent—the willful violators—then, as a system, we have taken a giant step towards "being all we can be."***

## VFR FLYWAYS CHART PROGRAM

THE FOLLOWING excerpt from an FAA proposed handbook change provides an excellent explanation of this program:

A VFR flyway is defined as a flight path along which an aircraft is intended to be flown. These flight paths could be designated from point to point, or could follow a river, coastline, mountain pass, valley or similar type of natural landmark or a highway, railroad, powerline, canal or any other visually identifiable path over the ground which is suitable for flight under visual flight rules. Charted VFR flyways also may follow specific radials of a VOR, or may be direct radials between navigation facilities or may follow a single radial providing transition to a route predicated on visual aids.

The intent of the charted VFR Flyway Chart Program is to provide pilots with suggested VFR flight paths that can be used to navigate safely in the vicinity of congested terminal areas. This program will be accomplished in two phases. The first phase will emphasize terminal control area (TCA) locations. These flight paths may be used as an alternate to flight within established TCAs. They are not intended to discourage VFR operations within TCAs, but are designed solely for information and planning purposes. The second phase of the program would, as necessary, expand the program to chart additional congested terminal and en route areas.

Pilot compliance with recommended flight paths and associated altitudes is strictly voluntary. ATC will not assign a VFR flyway route to a pilot as part of a clearance nor predicate separation of aircraft on expected pilot compliance with depicted altitudes.

The back of the existing VFR terminal area charts will contain the charted VFR flyway planning charts developed for Phase I. The charting of additional areas developed under Phase II would be deferred until the VFR Charting Task Group evaluates all national airspace review VFR chart recommendations.

Charted VFR Flyway Planning Charts will only be published for locations with existing TCAs published on VFR terminal area charts. Additional locations will only be considered after all TCA locations have been completed.

A VFR flyway will only be charted for flight paths on which aircraft currently operate. Once these flight paths are charted, they will not be moved unless they significantly interfere with other operations.

If you would like to see what one looks like, VFR flyway charts have been published on the back of TCA charts for Dallas, Houston, Los Angeles and San Diego.

*Readers are encouraged to address matters concerning air traffic control to: Director, USAATCA Aeronautical Services Office, Cameron Station, Alexandria, VA 22304-5050.*

# SKYREGS REVIEW:

# CONTROLLED AIRSPACE

## *Understanding the Federal airspace structure*

Mr. Barry Schiff

Reprinted from *AOPA Pilot* February 1985. Copyright Aircraft Owners and Pilots Association 1985, all rights reserved.

IN THE EARLY decades of Aviation, aeronautical charts were simple. With the exception of displaying widely scattered airports and a few navigational aids (NAVAIDs), they were little more than topographical charts. In some cases, they were road maps. A pilot could fly from place to place in total freedom. The airspace through which he flew was all the same: uncontrolled and essentially unregulated.

But as Aviation grew, the Civil Aeronautics Authority and then the Federal Aviation Administration (FAA) found it necessary to smother a pilot's chart with more than 20 types of overlapping and intertwining airspace (with more coming, no doubt).

Each type of airspace requires its own rules. The result can be confusion and conflict. There are certain places—especially in the vicinity of terminal control areas (TCAs)—where it is easy to violate one regulation or another.

The most common mistakes pilots make include confusion of airspace requirements. Many flight instructors and examiners do not know as much about the subject as they should. Consequently, misconceptions are legion.

One reason for the confusion is that the National Airspace System has developed piecemeal over the years. As each new layer or chunk of airspace was added, the FAA provided a legal definition and the justification, but often failed to explain the need adequately or clearly. It provides pieces of the puzzle but often fails to paint the "big picture." How many pilots, for example, understand the purpose of the continental control area (CCA) or why a control zone extends to 14,500 feet [mean sea level] MSL? (Control zones used to reach the heavens. There is a National Airspace Review recommendation to lower them to 3,000 feet.) This was the limit of the intermediate route structure.

Rather than discuss the components individually, it is better first to stand back for an overview. Once the fundamentals are understood, everything else falls into place, with a bit of work.

The most important concept to understand is controlled airspace. What is it? What is its purpose? In essence, controlled airspace is for the benefit of instrument rated pilots. This is where they can fly in instrument flight rules (IFR) weather conditions (or instrument meteorological conditions [IMC]) under the coordination of air traffic control (ATC). Pilots flying under visual flight rules (VFR) also are allowed in controlled airspace (without clearance) as long as they abide by the basic VFR weather minimums for controlled airspace, as shown in figure 1. An instrument pilot popping out of a cloud should be offered the opportunity to use the see-and-be-seen concept of traffic separation to prevent entanglements of the worst kind.

If the visibility and cloud-clearance requirements cannot be maintained, pilots operating VFR must not

| Altitude | Flight Visibility | Distance from clouds |
|---|---|---|
| 1,200 ft agl or less regardless of msl altitude | 3 sm | Clear of clouds |
| more than 1,200 ft agl, but less than 10,000 ft msl | | 500 ft below<br>1,000 ft above<br>2,000 ft horiz |
| more than 1,200 ft agl, and at or above 10,000 ft msl | 5 sm | 1,000 ft below<br>1,000 ft above<br>1 sm horiz |

FIGURE 1: Minimum VFR visibility and distance from clouds in controlled airspace.

# CONTROLLED AIRSPACE

enter or operate in any form of controlled airspace, period! It is that simple.

There are four basic types of controlled airspace: control areas, the continental control area, control zones and transition areas. The important point to remember about these is that—despite their different names—they are controlled airspace. Another point to remember is that if VFR weather conditions exist, a pilot may enter most types of controlled airspace without clearance. The exceptions are airport traffic TCAs and the positive control area, which begins at 18,000 feet. If conditions are IMC, a pilot must be instrument rated and obtain an ATC clearance.

Control areas are outlined on VFR aeronautical charts in blue shading and lead to the en route airspace structure, which has its own controlled airspace. In other words, control areas consist of the low altitude federal airways (and their extensions and enlargements). They usually begin at 1,200 feet above ground level (AGL), which means that the airspace beneath the floor of the airway is uncontrolled unless it underlies transition areas. Although low altitude airways extend up to but do not include 18,000 feet MSL, control areas as shown on aeronautical charts extend only up to 14,500 feet MSL, as shown in figure 2. (In Hawaii, control areas have no upper limit.)

Although en route IFR operations usually occur within control areas when below 14,500 feet MSL

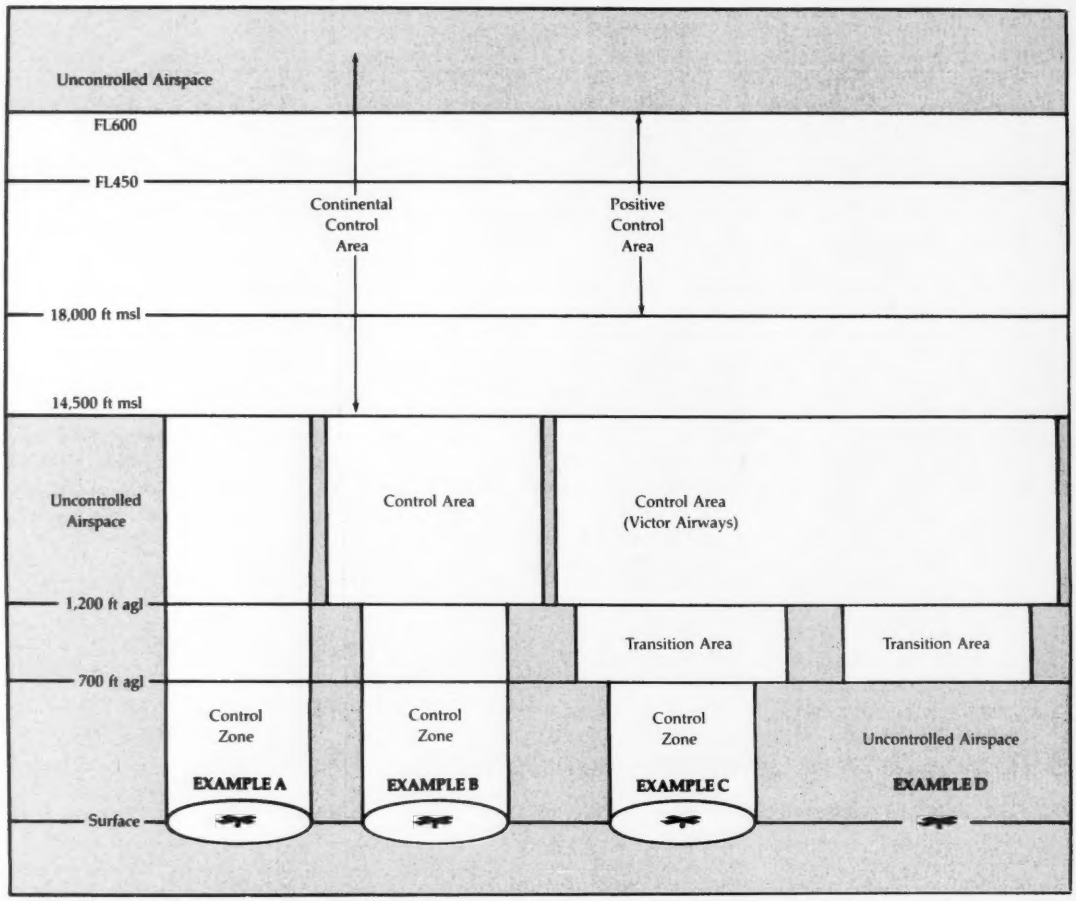



FIGURE 2: Controlled and uncontrolled airspace.

(separation from other traffic is not assumed outside of controlled airspace), they are given considerably more elbow room when at or above 14,500 feet MSL. At these higher altitudes, IFR traffic can get clearance more regularly to navigate via direct routes or radar vectors that do not follow federal airways. Consequently, all airspace at 14,500 feet MSL and above is designated as one mass of controlled airspace, and that is called the continental control area. Visual flight rules minimums increase when at or above 10,000 feet MSL.

As its name implies, the CCA exists only over the continental United States, except for Alaska's Aleutian Islands. Excluded also is all airspace less than 1,500 feet AGL.

There is no operational difference between a control area and the continental control area.

IFR operations need separation from other traffic not only while en route but also for IFR arrivals and departures. Transition areas and control zones are designated for these purposes. Control zones usually are outlined on aeronautical charts by dashed blue lines and surround one or more airports that have published instrument approaches. This type of controlled airspace extends from the ground up to the base of the continental control area (14,500 feet MSL), as shown by Example A in figure 2. Such an airspace configuration consisting only of the CCA and control zones would not be desirable, since pilots operating IFR want as much assurance of separation as possible. (However, it should be remembered that not all approaches are conducted into airports with control zones or completely within controlled airspace.) The only way to fly IFR to an airport and remain in controlled airspace inside such a control zone would be to remain within the CCA until almost directly above the airport and then spiral downward within the usually 10-mile-wide cylinder of controlled airspace.

For all practical purposes, control zones terminate at the base of some lower, overlying layer of controlled airspace. In Example B, the control zone extends from the ground to the base of the overlying control area, which is only 1,200 feet AGL.

May a pilot pass through a control zone without permission? Yes, as long as the mininum visibility and cloud clearance requirements (figure 1) are maintained.

There are, however, a few special rules pertaining to control zones. If the primary airport in the control zone is reporting less than a 1,000-foot ceiling, pilots operating under VFR may not fly below such a cloud layer within the control zone; however, they can fly through the control zone as long as they remain at least 1,000 feet above the cloud tops.

VFR minimums normally are predicated on flight visibility—the distance a pilot can see from the cockpit. The control zone, however, is an exception to the rule. A VFR pilot may not operate to or from an airport within a control zone unless the reported ground visibility is at least 3 miles. Flight visibility

## Airspace Quiz

*See if you can match each type of airspace on the left with the most accurate clue listed on the right. A score of 90% or better is excellent. A score of 70% or less suggests that a review of the Airman's Information Manual (AIM) is in order. Answers appear at the end of the article.*

| | |
|---|---|
| 1.____ Control area | A. Flight service station provides service |
| 2.____ Positive Control Area (PCA) | B. Voluntary pilot participation |
| 3.____ Control Zone (CZ) | C. NOTAM |
| 4.____ Continental Control Area | D. Victor airway |
| 5.____ Transition area | E. U.S. Capitol Building lies within one |
| 6.____ Airport Traffic Area (ATA) | F. Not below 2,000 feet, please |
| 7.____ Terminal Control Area (TCA) | G. Special VFR allowed (in most locations) |
| 8.____ Terminal Radar Service Area (TRSA) | H. IRs and VRs |
| 9.____ Warning area | I. VFR minimums are clear of clouds and one-mile visibility at low altitudes |
| 10.____ Prohibited area | J. Instrument rating required |
| 11.____ Restricted area | K. Substantial soaring activity, for example |
| 12.____ Military Operations Area (MOA) | L. Five-mile visibility |
| 13.____ Air Defense Identification Zone (ADIZ) | M. Group I and Group II |
| 14.____ Military Training Routes (MTRs) | N. 156 and 200 KIAS speed limits |
| 15.____ Airport advisory area | O. It stops when they see you coming |
| 16.____ Alert area | P. Outside the three-mile limit |
| 17.____ Uncontrolled airspace | Q. Invisible hazards to navigation, usually |
| 18.____ Special conservation area | R. VFR flight plan may be required |
| 19.____ Temporary flight restriction | S. Aerobatics and high-speed maneuvering |
| 20.____ Controlled firing area | T. Usually begins at 700 feet above ground level |

can be used as a substitute when operating to or from an airport within a control zone when ground visibility is not reported at that airport.

If an airport within a control zone has less than a 1,000-foot ceiling or less than 3 miles visibility, a pilot can request a special VFR clearance to operate to or from that airport. This clearance is unique to control zones and requires a minimum reported ground visibility of at least 1 mile and that he [the pilot] remain clear of clouds.

If a control zone is outlined on a VFR chart by a chain of blue Ts instead of by a blue dashed line, special VFR flight is not allowed.

The fourth type of controlled airspace is the transition area, which is outlined in magenta shading on VFR charts. It is used to help bridge the gap between a control area and a control zone (Example C in figure 2). In this way, the transition area, which begins at 700 feet AGL and terminates at the base of the overlying control area, provide additional controlled airspace within which instrument pilots can maneuver during an IFR approach. In effect, the transition area lowers the floor of the control area to 700 feet AGL.

Is there any difference between a transition area and the overlying control area? Only in size and shape. The rules of controlled airspace apply equally to both.

An interesting case is shown in Example D, which consists of an overlying control area and a transition area, but no control zone. The transition area implies the existence of an instrument approach to this airport, but the absence of a control zone implies otherwise. This is not an uncommon situation in mountainous areas. The airport does have an instrument approach, but the IFR minimums are so high that an instrument pilot must reach VFR conditions prior to reaching the floor of the transition area (700 feet AGL) or execute a missed approach. Upon reaching VFR conditions, the instrument pilot is on his own in avoiding other aircraft that may be under the floor of the transition area. In this case, the airspace beneath the transition area is uncontrolled (figure 3). VFR conditions in uncontrolled airspace require only 1-mile visibility.

The early part of this article stated that there are only four types of controlled airspace. If you will forgive me, that was a white lie intended to simplify matters, at least for the moment. These four types of controlled airspace—the control area, the continental control area, the control zone and the transition area—are what is unofficially referred to as *weather-related* airspace. In other words, a pilot may enter any of them without permission as long as VFR conditions for controlled airspace can be maintained.

There are two other types of controlled airspace that have little to do with weather but do require permission from ATC. The first of these is the positive control area (PCA). This blanket of airspace extends from 18,000 feet MSL to [flight level] FL600, a pressure altitude of 60,000 feet. (Imagine the freedom one could enjoy above 60,000 feet where all airspace—and space—is uncontrolled.) The PCA covers the 48 continental states as well as the mainland of Alaska and is restricted to IFR operations. Admission to this lofty layer also includes certain aircraft equipment requirements. The highest en route altitudes available for VFR operations, therefore, are 17,500 feet MSL eastbound and 16,500 feet MSL westbound.

Another type of controlled airspace requiring an ATC clearance is the TCA, colloquially referred to as the inverted wedding cake because of the way its layers expand, mushroom-like, with altitude. Since the TCA is controlled airspace, pilots must maintain VFR conditions while in the TCA, unless they are on an IFR flight plan.

There are two types of TCAs, designated Group I and Group II. Each has its own restrictions and equipment and operating requirements.

In order to operate an aircraft within a Group I TCA, a pilot must receive prior authorization from ATC. The aircraft must be equipped with an operable VOR [very high frequency omnidirectional range] or tactical air navigation receiver, a two-way radio capable of communicating with ATC and a Mode C (altitude reporting) transponder. In order to land and/or take off legally from an airport within a Group I TCA, a pilot must have at least a private pilot certificate. Student pilots may only fly *through* this airspace.

In order to operate an aircraft within a Group II TCA, a pilot must receive appropriate prior authorization from ATC. The aircraft must be equipped with those devices specified in Group I TCAs, except that altitude reporting equipment is not required, and transponders are not required for IFR flights operating to or from an airport outside of but in close proximity to the TCA. Student pilots may land, take off and fly through airports within a Group II TCA, provided they have the appropriate endorsements from their flight instructors.

Last, but not least, is the airport traffic area (ATA). Although traffic is controlled by ATC within an ATA, the ATA technically is uncontrolled airspace as far as weather requirements are concerned.

An airport traffic area extends from the ground up to, but not including, 3,000 feet above the airport

elevation and has a radius of 5 statute miles. The lateral dimensions of an ATA are not shown on aeronautical charts, but their presence is indicated by a blue airport symbol, which indicates that the airport is tower controlled. Pilots must be in contact with the tower prior to entering or operating within the traffic area, but they may overfly the ATA at or above 3,000 feet AGL without calling anyone. When the tower is closed, the ATA ceases to exist, and the airport becomes uncontrolled.

All airspace that is not controlled obviously is uncontrolled. Pilots may fly in such airspace as long as they maintain the minimums required for VFR flight in uncontrolled airspace, as shown in figure 3.

While pilots operating on IFR flight plans can obtain clearances to fly in uncontrolled airspace, separation is not assured. VFR flight is permitted with as little as 1-mile visibility.

Instrument flying (without a flight plan) is allowed in uncontrolled airspace, but those who operate in this manner are strictly on their own. Uncontrolled instrument flight requires that the pilot assume all responsibility for terrain avoidance and altitude selection (although he must abide by the hemispherical altitude rule, in case another aircraft is heading the other way). Also, there is no assurance of NAVAID quality or availability. Communications with ATC might or might not be possible, but, even if a pilot can contact ATC, there will be no attempt by a controller to separate IFR traffic in uncontrolled airspace.

Is it legal for an instrument pilot operating under Federal Aviation Regulation Part 91 to take off without an IFR clearance in instrument weather conditions from an airport not located in a control zone? Absolutely. He must, however, either establish VFR conditions or obtain a clearance prior to entering any controlled airspace that might lie above. This technique is used frequently by instrument pilots departing remote airports covered by a local layer of fog.

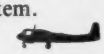
| Altitude | Flight Visibility | Distance from Clouds |
|---|---|---|
| 1,200 ft agl or less, regardless of msl altitude | 1 sm | clear of clouds |
| more than 1,200 ft agl, but less than 10,000 ft msl | | 500 ft below<br>1,000 ft above<br>2,000 horiz |
| more than 1,200 ft agl, and at or above 10,000 ft msl | 5 sm | 1,000 ft below<br>1,000 ft above<br>1 sm horiz |

FIGURE 3: Minimum VFR visibility and distance from clouds in uncontrolled airspace.

This is the basic structure and function of the regulatory hydra called controlled airspace. Not all of the various permutations and idiosyncracies of the National Airspace System have been covered. Pilots should recognize, also, that several changes to the structure and function of controlled airspace are in the works. One that is becoming a reality is the airport radar service area (ARSA), which already has replaced Stage III terminal radar service areas at Columbus, OH and Austin, TX. (See "Pilot News: ARSA Proposed for Baltimore-Washington International," January *Pilot*, P. 19.) [Also, ATC Action Line in the July 1985 *Aviation Digest*.]

The purpose of this has been only to provide a different perspective as a method of reviewing a subject that often receives inadequate attention.

Curiously, pilots operating under visual flight rules need to know more about airspace requirements than when operating IFR. This is because it is the VFR pilot's responsibility to determine where and under what conditions it is permissible to fly. IFR pilots simply operate in accordance with clearances from ATC. In this respect, the greatest demand is placed on the VFR pilot, for it is he who must thread his way alone through the quagmire of the airspace system.



## ABOUT THE AUTHOR

Barry Schiff, AOPA 110803, is an airline captain and an FAA-designated examiner. He has all seven flight instructor ratings and has flown more than 200 types of aircraft.

**Answers to Airspace Quiz:**

**1 (D), 2 (J), 3 (G), 4 (L), 5 (T), 6 (N), 7 (M), 8 (B), 9 (P), 10 (E), 11 (Q), 12 (S), 13 (R), 14 (H), 15 (A), 16 (K), 17 (I), 18 (F), 19 (C), 20 (O).**

**Army Astronaut Candidates' Applications Due 1 October**

The Army announced the 1985/1986 Army Astronaut Candidate Selection Program in military personnel office (MILPO) letter 85-10 dated 18 April 1985. The letter outlines the selection criteria and provides procedural guidance necessary for Active Duty and Reserve Component personnel to apply for the shuttle program. The Army began accepting applications on 1 July 1985 and will continue to accept them through 1 October 1985.

Any Army member meeting the criteria outlined in the MILPO letter who aspires to become an astronaut is encouraged to submit an application. For additional information contact Mrs. Smith at AUTOVON 221-0593/94, or Commercial (202) 325-0593/94.

# Standardization of Collective Training

Aviation training traditionally has been primarily oriented toward developing individual skills. Student aviator training develops those skills which are necessary *fundamentals prior* to beginning *mission* or *collective* training. The rigid standardization of the program of instruction in flight school is designed to provide each individual a virtually identical flight education. Following initial flight training the individual pilot annually prepares for and receives a standardized evaluation of his performance of the individual tasks required in the appropriate aircrew training manual (ATM). We have become accustomed to standardization of our individual tasks.

Upon completion of initial and advanced flight training a new aviator arrives in a unit with a distinct set of skills and is integrated into the unit's aircrew training program which supports the unit collective training plan. The commander develops and administers the plan according to mission requirements, flight hours available and through the use of standardization instructor pilots, instructor pilots, and junior officers. The standardization of this training is achieved through reference to pertinent field manuals, field circulars, etc. Because this training literature can be interpreted in different ways and because different tactics may be employed to conform to differing situations, geographic locations, etc., there is frequently less than complete standardization of collective training.

How could we improve standardization of our Aviation collective training? We do not wish to reduce the initiative and individualism that trainers exercise in preparing for combat. We do, however, want to *ensure that established, proven doctrine is implemented* uniformly and used as a basis for all training. Aviation units could become more proficient in performing their fundamental missions if there is applied the same degree of standardization to our collective training as exists in individual aviator training.

One of the measures used to standardize collective training is the Army Training and Evaluation Program (ARTEP). The ARTEP manual could be described as an "ATM" for unit level tasks. When the manual is used continuously, rather than only in preparation for an annual exercise, it can be a useful training guide.

Too often readiness peaks in anticipation of an evaluation and declines afterward. Sometimes this is unavoidable due to the multitude of tasks to train and the resource constraints involved. However, as a minimum, a unit should be proficient in a relatively small number of selected fundamental missions.

The new ARTEP manuals designate "minimum

essential missions" for different type units. These missions should be an integral part of all other training the unit does. They should be rehearsed so frequently that they are second nature to the unit members. If possible, training for these missions should be continual and incorporated in all larger exercises. Standardization is achieved through use of the ARTEP manual, field manuals, drills and carefully constructed training scenarios.

Standardization of collective training will ensure that the units are uniform in the execution of common missions. This reduces the amount of additional training required to bring a new arrival "on board." In short, standardization of collective training can reap benefits in increased combat readiness, reduced training time and more efficient use of resources allocated for training.

We are accustomed to standardization of required individual tasks and train for them accordingly. We should strive for an equivalent degree of standardization—established, proven doctrine—in our collective training.

***DES welcomes your inquiries and requests to focus attention on an area of major importance. Write to us at: Commander, U.S. Army Aviation Center, ATTN: ATZQ-ES, Ft. Rucker, AL 36362-5000; or call us at AUTOVON 558-3504, FTS 533-3504 or commercial 205-255-3504. After duty hours call Ft. Rucker Hotline, AUTOVON 558-6487 or 205-255-6487 and leave a message.***

# Warrants Redefined by TWOS

Proposals made by the Total Warrant Officer Study (TWOS) group and approved in June by the Chief of Staff of the Army will have a major impact on the management of all warrant officers (WOs), and especially those in Army Aviation. Included is a new warrant officer definition: "An officer appointed by warrant by the Secretary of the Army, based on a sound level of technical and tactical competence. The warrant officer is the highly specialized expert and trainer who, by gaining progressive levels of expertise and leadership, operates, maintains, administers and manages the Army's equipment, support activities or technical systems for an entire career."

That definition means WOs will be assigned to jobs of increased responsibility throughout their career, and that will be accomplished by use of a new position grading system. Use of that system will allow identity of the positions within Aviation that require the basic skills of the warrant officer, W1/W2; the advanced skills of the senior warrant officer, W3/W4; or the highly specialized skills of the master warrant officer, W5.

In order to implement the approved TWOS proposals quickly, an Aviation Warrant Officer Advisory Board composed of warrant and commissioned officers has been formed at Ft. Rucker. Your ideas on this implementation are solicited. Send them to: Commander, U.S. Army Aviation Center, ATTN: ATZQ-P, Ft. Rucker, AL 36362-5000. The point of contact in the Aviation Proponency Office is CW4 David Day, AUTOVON 558-3423/5706.

## U.S. Army Class A Aviation Flight Mishaps

| | Number | Flying Hours (estimated) | Rate | Fatalities | Total Cost (in millions) |
|---|---|---|---|---|---|
| FY 84 (to 9 August) | 34 | 1,297,896 | 2.62 | 32 | $50.3 |
| FY 85 (to 9 August) | 43 | 1,283,162 | 3.35 | 29 | $71.9 |

# AVIATION PERSONNEL NOTES

**Distribution of DA Form 759s—Attention Operations Personnel**

The DA Form 759 is an extremely important document to the individual aviator, and the Aviation Center is currently planning to automate this Individual Flight Record and Flight Certificate. In the meantime, however, the personnel managers here at MILPERCEN would like to ensure that each aviator's career management file contains the most current copy of this important record. A recurring problem associated with this task is the forwarding of these documents to improper agencies. Table 1-1 of AR 95-1 with change 3 prescribes the distribution of the copies of the DA Form 759. Despite the change to the regulation indicating the proper routing of the second copy of the DA Form 759, flight operations personnel are still sending these copies to improper addresses. Therefore, here are the addresses which should receive the second copy of the DA Form 759.

**Aviation Branched Commissioned Officers (SC 15)**

Commander
USA MILPERCEN
ATTN: DAPC-OPE-V
200 Stovall Street
Alexandria, VA 22332-0400
AUTOVON 221-0433/9366/0794

**Aviation Branched Warrant Officers (100 series)**

Commander
USA MILPERCEN
ATTN: DAPC-OPW-A
200 Stovall Street
Alexandria, VA 22332-0400
AUTOVON 221-7835/7836

**Medical Service Corps Commissioned Officers**

(SSI 67J and Flight Surgeons)

HQDA
ATTN: DASG-HCO-A
Washington, DC 20310-2300
AUTOVON 227-1469

Please ensure that your flight records personnel receive these addresses.

**Just the Facts**

Career management at the U.S. Army's Military Personnel Center at Alexandria, VA, may not be as mysterious as it seems. But misconceptions cause confusion for many soldiers.

As MILPERCEN's nearly 3,000 people talk and work with soldiers they manage, they hear many rumors and misconceptions about promotions, assignments, schools, evaluation reports and professional development. Highlighting some of these misconceptions and explaining the facts may help clear up some of the confusion about personnel management.

***Why isn't my enlisted promotion date the same as the effective date of my promotion?***

Enlisted promotions are made on the first day of each month, unless the promotion order says otherwise. The effective date of the promotion is based on promotion points for grades E5 and E6. E7 through E9 promotions are based on the order of seniority. Enlisted promotions are controlled by Headquarters, Department of the Army (HQDA), which limits the number of promotions that can be made each month. Advancements to E4 and below are authorized on the basis of a unit's assigned strength and a soldier's promotion eligibility. The effective date and date of rank for advancements to E4 and below are normally the same date, since this date corresponds to the date that a recommended soldier is first eligible for advancement within the promotion month. For promotions to E5 and above, HQDA determines the number of soldiers that can be promoted during the promotion month.

These promotions are effective on the first day of the promotion month, since all promoted soldiers meet the promotion eligibility requirements or they wouldn't be on a promotion recommended list. These soldiers are awarded a date of rank during the preceding month based on their promotion points or seniority. This action begins pay at the earliest date for the promotion month and maintains a distinguishing date of rank for establishing seniority among the noncommissioned officer ranks.

# HOTLINE

The following HOTLINE numbers can be called on official business after duty hours. They will be updated and reprinted here periodically for your convenience. If your agency has a Hotline it would like included, please send it to *Aviation Digest,* P.O. Box 699, Ft. Rucker, AL 36362-5000.

| | | FTS | AUTOVON | Commercial |
|---|---|---|---|---|
| **Armor** | Ft. Knox, KY | 354-8265 | 464-8265 | 502-624-8265 |
| **Aviation** | Ft. Rucker, AL | 533-6487 | 558-6487 | 205-255-6487 |
| **Aviation Logistics** | Ft. Eustis, VA | 988-6166 | 927-6166 | 804-878-6166 |
| **Camouflage** | Ft. Belvoir, VA | None | 354-2654 | 703-664-2654 |
| **Engineer** | Ft. Belvoir, VA | None | 354-3646 | 703-664-3646 |
| **Field Artillery, ARTEP** | Ft. Sill, OK | None | 639-2064 | 405-351-5004 |
| **Field Artillery, Redleg** | Ft. Sill, OK | None | 639-4020 | 405-351-4020 |
| **Fuels and Lubricants** | R&D Center, Ft. Belvoir, VA | None | 354-3576 | 703-664-3576 |
| **Ground Power Units** | Tooele Army Depot, UT | None | 790-2129 | 801-833-2129 |
| **Health Sciences, Training** | Ft. Sam Houston, TX | None | 471-4785 | 512-221-4785 |
| **Infantry, ARTEP** | Ft. Benning, GA | 784-4759 | 835-4759 | 404-545-4759 |
| **Infantry, School** | Ft. Benning, GA | 784-4487 | 835-4487 | 404-545-4487 |
| **Intelligence** | Ft. Huachuca, AZ | None | 879-3609 | 602-253-3609 |
| **Maintenance and Supply** | Tobyhanna Army Depot, PA | None | 795-7900 | 717-894-7900 |
| **Missiles and Munitions** | Redstone Arsenal, AL | None | 746-6627 | 205-876-6627 |
| **Ordnance (Help Line)** | Aberdeen Proving Gnd. MD | None | 298-4357 | 301-278-4357 |
| **Quartermaster** | Ft. Lee, VA | 927-3767 | 687-3767 | 802-734-3767 |
| **Signal** | Ft. Gordon, GA | 240-6703 | 780-6703 | 404-791-6703 |
| **Soldier Support Center** | Ft. Benjamin Harrison, IN | 542-4962 | 699-4962 | 317-542-4962 |
| **Supply** | New Cumberland Army Depot, PA | None | 997-7431 | 717-782-7431 |
| **Supply** | R&D Center, Natick, MA | None | 256-5341 | 617-651-5341 |
| **Turbine Engines** | Corpus Christi Army Depot, TX | None | 861-2651 | 512-939-2651 |

United States Army Reserve

# WARRANT OFFICER SENIOR COURSE

## READINESS THROUGH EDUCATION


**By the 1984/1985 WOSC Class of the 6236th School:**

CW2 Richard W. Curtice
CW3 Vernon J. Ellison
CW3 Fred G. Hooker
CW3 Ernest D. Kingsley
CW2 Albert J. Laine
CW3 Raphael A. Martel
CW3 Dennis J. McCullough
CW3 Orlow L. McInelly
CW3 Maynard R. Midthun
CW3 Jerry D. Robins
CW3 Marshall K. West


**Warrant officer career opportunities in the Army are greater than ever, in both the Active and Reserve Components. However, little is widely known about many of these opportunities. The 1984-85 Warrant Officer Senior Course (WOSC) Class of the 6236th United States Army Reserve School was involved in the professional writing portion of instruction when the idea was conceived to put together for publication an informational article about the course. The main purpose of this article is then, to familiarize the reader with the WOSC and one of the 93 United States Army Reserve schools involved in warrant officer education programs.**

THE WARRANT OFFICER Senior Course (WOSC) is the highest military education a warrant officer can receive, and board selection to attend the resident course at Ft. Rucker, AL, is viewed by the Active Component Army as coveted recognition of outstanding service.

The proponent agency for the WOSC is the United States Army Aviation Center, Ft. Rucker, but the actual course content is offered in three formats:

- First is the resident course, located at Ft. Rucker.
- Second is the correspondence course, which is available from the Institute for Professional Development, Ft. Eustis, VA.
- Third is the United States Army Reserve (USAR) school version, and it is provided as one of the courses of instruction offered by many of the 93 USAR schools.

The course material used by the USAR schools is the same as that of the resident school (Ft. Rucker) with only a few changes to meet the needs of the Reserve Component warrant officers. The course rotates through two quarters per year, and graduates a class every other year. The following are several aspects of the Warrant Officer Senior Course.

**Perspective**

Career impact of the Warrant Officer Senior Course is somewhat different in the Active and Reserve Components. Authorized warrant officers of either component who have completed the senior course by any means are awarded a "4A" identifier as a suffix to their military occupation specialty (MOS) designation.

Changes are planned in the Active Component to allow only selected warrant officers to take the course, even by correspondence. This will allow Department of the Army, Warrant Officer Branch, to control who has the opportunity to receive this coveted identifier based upon who is best qualified, and then assign graduate warrant officers against duty positions designated as "4A" duty assignments. It offers a means by which those leadership skills that the warrant officers learned and demonstrated may be used for the benefit of the Army. It also will provide warrant officers opportunities to increase their job satisfaction by offering them opportunities for increased responsibility. The senior course is not a prerequisite for promotion in the Active Component whereas it is in the Reserve Components, and after selection to the rank of CW4, the individual is *not* considered for attendance to the WOSC unless requested by the individual in writing.

National Guard and Army Reserve careers are affected by the WOSC differently than Active Army careers. In general, promotions cannot be had without advanced military education, although National Guard regulations governing promotions vary from state to state. With few exceptions, the Warrant Officer Advanced Course is required for promotion to CW3, and the senior course is required for promotion to and/or retention in the grade of CW4. Either course may be completed by any one of the methods mentioned, including the resident course. Attendance at the course is not dependent on a selection board as it is in the Active Component.

The purpose of the senior course is to round out the general knowledge of warrant officers by exposing them to many other areas of expertise which are not necessarily their own. It is designed to help them understand the integrated organization, functions and operations of the Army worldwide, joint and combined commands; and to develop professional staff, leadership and management skills.

**Reviewing the course materials are, from left to right, CW4 Robert Geis, WOSC instructor from Paine Field, WA; LTC William Schoonover, director of officer courses; and CW4 Lewis Law Jr., WOSC instructor, Tacoma, WA.**

**WOSC In USAR Schools**

The senior course has been offered at USAR schools for about 8 years, and has met with a great deal of success. It is given in four parts over a period of 2 years. These segments may be taken in any order; i.e., Phases III and IV before or after Phases I and II. Each of these phases is compatible with the similar segment from the correspondence course, and should any warrant officers be unable to complete the entire course with the school, they may complete it by correspondence.

Phase I consists of twenty-four 4-hour periods, or about one period per week for 6 months.

Phase II is one 2-week exercise on a college campus or at an active military post.

Training in Phases III and IV is made up of a similar schedule, and the course may be completed in 2 years of regular attendance.

Prerequisites for enrollment are:

• Applicants must be warrant officers of any component in the grade of CW2 (P) or higher.

**ABOVE: Senior course members discussing counseling techniques are left side, near to far, CW3 Ed Kingsley and CW4 Lewis Law, Jr., the instructor; and right side, near to far, CW3 V.J. Ellison, CW3 R.A. Martel, CW2 A.J. Laine and CW4 J.D. Robins.**

**BELOW: Discussing World War II battles are, left side (left to right), CW2 R.W. Curtice, CW2 A.J. Laine, CW3 R.A. Martel; and right side, near to far, CW3 F.G. Hooker, CW3 V.J. Ellison, CW3 M.R. Midthun and CW4 Lewis Law Jr., instructor.**

photo by CW3 Marshall West

• Army National Guard warrant officers in the grade of CW2 who are educationally qualified for promotion may be enrolled.

• Reserve Component warrant officers who are graduates of an officer professional development (advanced) course that is appropeiate for their MOS are eligible for enrollment.

• Students must not have received credit for this course.

• Individuals must meet standards listed in AR 600-9 and AR 350-152.

**WOSC In The 6236th USAR School**

Historically, variety has been the norm in this school, and this class is no exception. It consists of 11 warrant officers who average 20 years of federal service. Four have federal service exceeding 30 years and only one has less than 11 years of experience.

Three are aviators (two of whom are Active Army), three are boat warrants (all National Guard), three are Criminal Investigation Command (CID) warrants, one is a maintenance officer and one is a physician's assistant (Active Army). Three are Active Duty, three are National Guard, five are Army Reserve.

The experience of our class covers much of the spectrum of recent United States military involvement. Two of the CID agents have been involved in investigations ranging from theft to war crimes (Vietnam). One of them is the only currently certified reservist polygraph examiner in the Army. One (our maintenance type) spent World War II in the South Pacific on a destroyer, and then helped rescue the prisoners of war who were held in a camp adjacent to Nagasaki after the atomic bomb was dropped on Japan. The three older warrant officers served during the Korean War. One was assigned as a bodyguard for General Douglas MacArthur when he returned from Korea. The senior Active Duty warrant officer is one of the junior men in the class (14 years). The result of the mix of this varied experience through class communication is a genuine professional enrichment of every individual. In fact, we have a pretty good time as a group.

**The School Attendance Versus Correspondence Course**

Advantages to this format of WOSC center around the convenience of the school. Across the board, the people in the class feel that they prefer to attend this weekly rather than attempt the correspondence course. The meetings are held regularly, are conveniently located and the instructor is knowledgeable, with more than 36 years of federal service on his own part. The fellowship is a good side benefit, something which cannot be had from a correspondence course. Class content, occasionally on the unexciting side, is upgraded by the fellowship and the professional exchange. There is another advantage which carries a lot of weight.

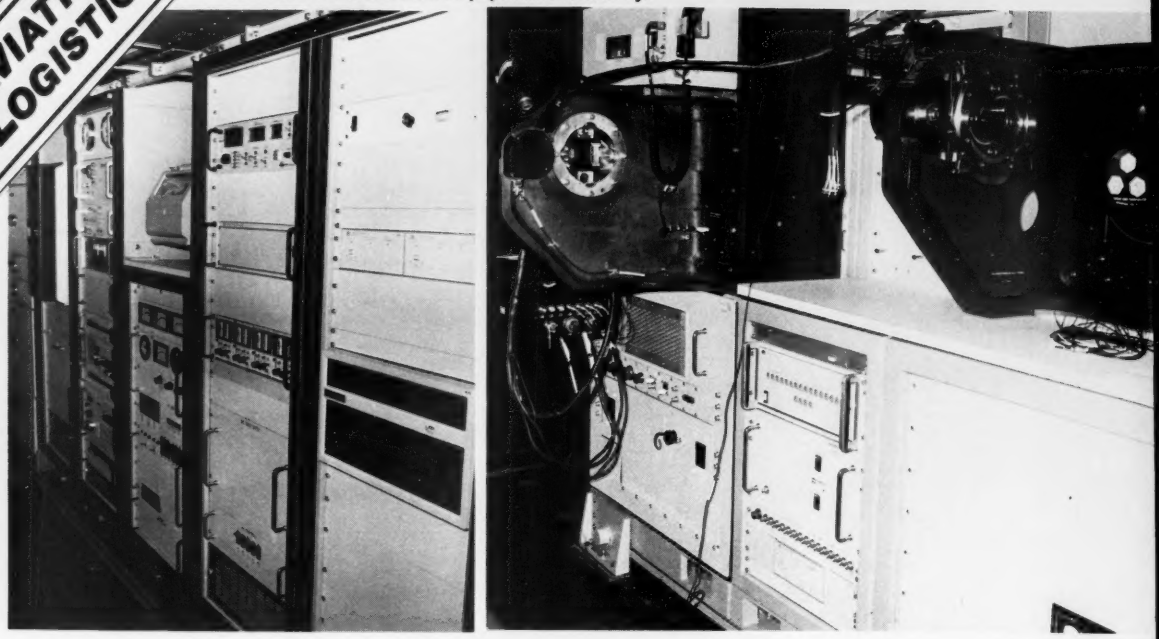
The 2-week summer exercise for the 6th Army WOSC is conducted at the University of Nevada, Reno. The campus, facilities and classes are rated in a purely impartial and professional way by this class as follows:

- Sleeping Arrangements : Adequate
- Mess Facility : Excellent
- Classroom Facilities : Adequate
- Classroom Instruction : Marginal to exceptional, depending on instructor
- Recreational Facilities : Outstanding!

Without a doubt, there are disadvantages to the USAR school format. It takes 2 full years to complete, as opposed to whatever speed the horse can muster in the correspondence course. There are some minor adjustments the system must make to grant the approval required for an Active Duty warrant to take the course. Some individual classes develop more esprit than others (here we have a real advantage in our class). Some instructors are better than others (ditto previous comment). It soaks up one night every single week, a big price to pay whether Active Duty or part time with a full-time civilian job. The 2 weeks each year to Reno are sometimes charged to the Reserve Component warrants as vacation time, making it more inconvenient than it might otherwise be.

The 6236th USAR school has succeeded in its effort to provide a quality education program for the local Warrant Officer Corps, and to provide the career enhancement needed to improve the Army mission. The additional benefit which was not expected by any of us is the esprit de corps that we have developed. It is a great experience to turn a professional chore into a night out with friends! If you are eligible for WOSC, stop in at your local USAR school for details on the next class—and just wait until next year!

Two views of the electronic equipment test facility.



# Automation and Aviation Maintenance—

## A Combat Developer's Perspective

**Captain Richard G. Hatch**
U.S. Army Logistics School
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INHERENT WITH the decision to use modern technology in Army Aviation is the responsibility to support those technologically advanced systems with compatible test, measurement and diagnostic equipment (TMDE). The program managers for the AH-64A Apache and OH-58D Kiowa, for example, are planning to use automatic test equipment (ATE) to test and diagnose failures of selected aircraft line replaceable units (LRU).

The electronic equipment test facility (EETF) for the Apache and the Test Support System (TSS) for AHIP (OH-58) are significantly different in terms of complexity; however, the concepts for operation and employment are similar. Both EETF and TSS will incorporate a core computer comprised of a power supply, input, output and necessary control devices to interface the ATE with a particular unit under test (UUT). This core will then be augmented with supported system peculiar equipment, i.e., pneumatic

modules, photometer video monitors, electro-optics, test benches, etc.

Examples of onboard systems requiring support for the Apache are Target Acquisition Designation System/Pilots Night Vision System, Hellfire, air data subsystems, Integrated Helmet and Display Sighting System and the mast-mounted sight and control display system for AHIP. Finally, the core and peculiar systems will be housed, along with all the ancillary items necessary for support of a fielded system in a mobile complex for total unit compatibility.

Test program sets (TPSs), sets of computer software consisting of a computer program, special technical documentation and interface devices (connecting cables), are required for each LRU that the ATE will support. These TPSs allow for computer and LRU testing through computer program instructions and electronic interface between UUT (the LRU under tests) and the ATE. These computer programs will require special handling and storage and are the key to ATE operation for supported LRU.

A goal for automation in Aviation maintenance is for a total package, single station concept to consolidate the TMDE capabilities while enhancing supportability, reducing TMDE proliferation and maintaining system operational readiness through increased availability of critical LRU resources within the command. Intermediate forward test equipment (IFTE) is the newest planned system on the horizon to fulfill this goal. It is currently in the early stages of the acquisition life cycle process. IFTE is designed to support additional sophisticated systems, such as light helicopter family, joint services advanced vertical lift aircraft, etc.

IFTE requirements identify three major components—contact test set (CTS), base station test facility (BSTF) and electro-optics test set (EOTS). CTS will be employed at Aviation unit maintenance and Aviation intermediate maintenance (AVIM) to fill the void between onboard built-in test (BIT) and IFTE. The BSTF and EOTS will be employed at AVIM as the state-of-the-art ATE technology required to support technological advances in Army Aviation during the 1990s. Integration into the modernized Army combat forces is planned for the late 1990s.

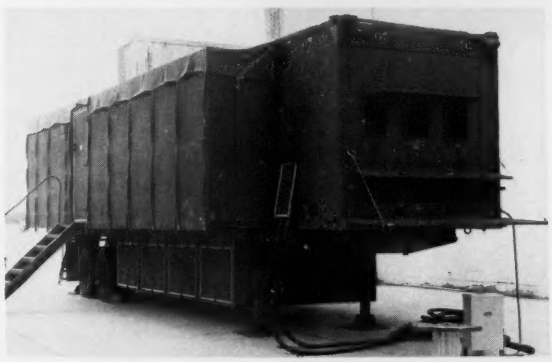
Engine monitoring system, improved BIT and built-in test/diagnostic equipment are some of the newest technologies being investigated. Improved design and performance for increased operational availability by reducing maintenance diagnostics and troubleshooting times are just a few of the desired objectives of these systems.

These advances in automated TMDE, which have only briefly been discussed, are emerging—some in the very near future. They are oriented to the unit or intermediate maintenance level for the user in the field and justifiably so; however, the responsibilities of maintainers and logisticians do not stop there. An effective and expedient means to report, manage and capitalize on information gathered in one unit must be capable of being shared with other Aviation maintenance units and activities. The only way to do this is with a realistic and usable maintenance and management reporting system.

The time is right to begin integration of computers and a computer generated and maintained Army Maintenance Management System into Aviation maintenance. Certainly, current Aviation maintenance philosophies and practices will have to be evaluated and improved. However, don't our highly sophisticated "new generation" aircraft warrant such a relook?

Developing, updating and monitoring software, i.e., technical manuals, reports, etc., status and disposition of supply actions, timely and accurate aircraft status, and an improved direct management of critical and high cost aircraft components and systems are just a few of the benefits that can be gained. This proposed change to the traditional means of Aviation maintenance and maintenance management philosophies using automation will not be totally void of problem areas. Exposure to and awareness of potential benefits and ease of integration to all concerned will be one of the first major hurdles. Users, supervisory and command personnel at all levels, will have to be trained and thoroughly briefed. The computer is here and soon will be merging with Army Aviation.

It is incumbent upon users at all levels throughout the Aviation community to consider the advantages to be gained by understanding and exploiting the computer base as an integral part of Aviation maintenance.



**Exterior view of the electronic equipment test facility.**

**"Big Crow" is the U.S. Army's Airborne Electronic Warfare Laboratory onboard an NKC-135.**

# *Electronic Warfare Laboratory and Signals Warfare Laboratory-Partners in the Electronic Warfare Arena*

Captain P. Greg Kaufman
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This is the fourth in a series of articles dealing with the Electronics Research and Development Command (ERADCOM) and the various contributions its subordinate laboratories and activities make to Army Aviation. Copies of previous articles may be obtained by writing to *Aviation Digest,* P.O. Box 699, Ft. Rucker, AL 36362-5000, or calling AUTOVON 558-6680 or FTS 533-6680. The articles are: (1) "Atmospheric Science Laboratory: Weather Intelligence Enhances Capabilities" (April 1985); (2) "EFTA Validation Concept Throughout Development" (May 1985); (3) "NVEOL and FTD" (July 1985).

IN RECENT YEARS, the concept of the "integrated battlefield" has gained wide spread recognition and use within the Army's tactical doctrine developmental and educational institutions.

As outlined in numerous doctrinal publications, the integrated battlefield may be a combination of nuclear, chemical, electronic and smoke/obscurant warfare elements. These will make the future battlefield a more dynamic arena than did battles of the past.

With the current train of thought that technological superiority will offset numerical disadvantage, it is incumbent upon the research, development, test and evaluation (RDTE) community to provide the technology that will allow the soldier to gain the decisive edge.

In confronting the total challenge presented by the integrated battlefield, the sheer size of the RDTE effort required should be obvious. For the Army Aviation community, the necessary equipment to fight and survive may be somewhat more particularly specialized than for other combatants. Yet the need exists not only for equipment oriented toward aircraft survivability, but also for equipment that is offensive in nature.

MONTHLY WRITING AWARD

**The Electronic Warfare Lab operates this test stand at the Earle Wayside test area just outside of Ft. Monmouth. This stand allows for the static testing of systems prior to flight testing. It also allows for instrumented test data to be collected.**

Many systems currently are being introduced into the inventory that are the result of development over the past 10 years. Marked by sophistication and lethality, these systems are effective force multipliers when properly employed. However, with a dependence on technology, these systems all share one thing in common. They heavily rely on electronics for their effectiveness. With the known commitment of threat forces to radioelectronic combat, the battle in the electromagnetic spectrum *may* be the decisive one.

The Electronics Research and Development Command (ERADCOM) is at the forefront of the Army's electronic warfare (EW) efforts. The commanding general of ERADCOM functions as the program manager-intelligence/electronic warfare. Also included in the ERADCOM family is the laboratory team of the Electronic Warfare and Signals Warfare Laboratories (EWL and SWL). They are responsible for ensuring that the Army can function in the electromagnetic spectrum on the integrated battlefield.

**Electronic Warfare Laboratory**

EWL is one-half of the team that provides the Army with the EW capability to counter battlefield threats and assures effective operation of our systems in a hostile EW environment.

Its mission is research, development, initial acquisition and first fielding of selected electronic warfare and intelligence material to detect, locate, exploit, deceive or disrupt hostile use of the electromagnetic spectrum while supporting continued friendly use of the spectrum. This is accomplished in the area of noncommunications and selected communications EW intelligence equipment and jamming equipment, along with development of electronic counter-countermeasures (ECCM) recommendations and techniques.

EWL's technologies include sensors, direction-finding and emitter location devices, standoff and self-protecting jamming, automated data management, high speed complex signal processing and software generation and support. The best way to illustrate the breadth of EWL's involvement in EW is to examine programs which have been fielded by EWL and currently are being developed for Aviation applications.

EWL is the laboratory that the program manager-aircraft survivability equipment (PM-ASE) turns to when it is necessary to develop new, or to improve existing, ASE. Within EWL, the Electronic Warfare Protection Division is charged with this mission of RDTE and initial acquisition of electronic support

measures (ESM) and electronic countermeasures (ECM) against enemy electromagnetically aided weapon systems, including radar, infrared (IR) and electro-optics.

Some of the airborne self-protection systems that EWL has developed are the familiar AN/APR-39 and AN/APR-44 radar warning receivers. These systems alert aviators that the aircraft is being acquired by a radar associated with a weapon system. Identifying the radar allows aviators to take the appropriate action to counter the weapon associated with that particular radar.

IR and radar jammers are now making their appearances on Army aircraft. The AN/ALQ-144 and AN/ALQ-147 IR jammers are designed to protect small and medium size aircraft from both ground-launched and air-to-air missiles. The AN/ALQ-136 and AN/ALQ-162 systems provide a radar jamming capability for Army aircraft. These should help to degrade hostile air defense, counterbattery/counter-mortar and battlefield surveillance radars. Employment is visualized not only for manned platforms but also for the remotely piloted vehicle.

The AN/ALQ-156 is a helicopter-borne pulse Doppler radar system that is used for the detection of approaching missiles. A variation of AN/ALQ-156 for special electronic mission aircraft (SEMA) is being developed.

Finally, the AN/AVR-2 laser warning receiver intercepts, identifies and provides location of laser emissions from threat weapon systems. It provides both audible and visual alarms when integrated with the AN/APR-39.

EW is largely reactive in nature; i.e., needs are determined by the employment of threat weapon systems. Thus, EWL maintains strong technology programs in the radar, IR and electro-optics countermeasures fields to permit quick EW response to new threat systems as they appear.

There also are two major airborne ESM systems for which EWL is responsible. QUICK LOOK II is an airborne electronic intercept and location system designed to exploit enemy noncommunications electromagnetic emitters. It is deployed on the RV-1D Mohawk. The heart of the system is the AN/ALQ-133 countermeasures receiving set. The AN/ALQ-133 is data linked to associated ground stations. Advanced QUICK LOOK is a modular, platform independent system for airborne *or* ground-based applications.

The other major ESM system is GUARDRAIL. This is a remotely controlled airborne intercept and radio direction-finding system designed to exploit enemy ultrahigh frequency and very high frequency communications to locate command and control facilities. This system has had numerous versions produced, the most current being the Improved GUARDRAIL V being deployed on the RC-12D Huron. The RU-21 H Ute is still used for the employment of the GUARDRAIL V.

**TOP: The QUICK LOOK II system employed on the RV-1D Mohawk allows for the airborne electronic intercept and location of enemy noncommunications emitters.**

**CENTER: The Improved GUARDRAIL V system mounted on the RD-12D Huron is a UHF and VHF intercept and target location system operating against enemy command and control sites. It consists of a large ground complex for remote control of mission equipment in six aircraft, processing of collected information and real-time reporting to tactical commanders at corps and below.**

**BOTTOM: The EH-60 QUICK FIX II system provides for airborne intercept, direction finding and jamming of communications signals.**

In order to reduce the total number of airborne platforms required for these missions, EWL is working to consolidate sensors. By combining multiple sensors and providing for onboard processing of information, the number of required aircraft is not only reduced, but there also is a reduction in the amount of information which must be transmitted over data links. COMMON SENSOR is an EWL JPACE-managed program which will combine the Improved GUARDRAIL (communications), the Advanced QUICK LOOK (noncommunications), and Coherent High Accuracy Airborne Locating System into the C-12.

EWL has an outlying facility at White Sands Missile Range, NM. This facility is the Office of Missile Electronic Warfare (OMEW). The name is somewhat misleading as OMEW is concerned not only with missiles, but also with all electronic systems. It gives the Army the capability to assess the EW vulnerability of both U.S. and foreign systems, provides recommendations for ECCM hardening to U.S. systems developers, and provides recommendations on methods and techniques for defeating foreign threat systems. These ECM vulnerability assessments are conducted using a comprehensive inventory of simulators and threat instrumentation which approximate hostile ECM environments, as well as numerous other special facilities.

Once the vulnerability of our systems to the threat is determined, OMEW develops or recommends ECCM hardening techniques to make them less vulnerable. An example of a fix that resulted from these vulnerability assessments is the steerable null antenna processor (SNAP). It permits the steering of an antenna null in the direction of a hostile jammer, thus attenuating the jamming energy drastically. SNAP will be for both air and ground application.

OMEW controls a modified Air Force NKC-135 that is used as an airborne EW platform primarily in support of Army test requirements. Dubbed "Big Crow," it permits the conduct of precise EW exercises. It can create active and passive ECM environments, dispense chaff, and generate a variety of deception signals including barrage, spot, cross-polarized and continuous wave noise. Big Crow also can carry missile subsystems either internally within its special radomes or externally mounted under its wings.

**Signals Warfare Laboratory**

As mentioned earlier, EWL is just half of the Army's EW team. Another ERADCOM laboratory, the Signals Warfare Laboratory, completes the EW effort. SWL's primary mission is to provide the Army with effective tactical communications intelligence and signals intelligence, as well as a family of EW systems.

The enemy's numerical superiority in manpower and equipment poses a serious EW threat to our forces. To counter this threat and to provide for our signal security, SWL develops prototype or first-production tactical communications/intelligence and EW systems. These systems are not only designed to disrupt enemy communications during critical points of the battle, but they also will screen our operations from enemy intercept and direction-finding. Once developed, these systems are integrated into the Army's combat electronic warfare and intelligence units as well as into fixed Intelligence and Security Command installations.

The primary Aviation related system developed by SWL is QUICK FIX, which provides for airborne intercept, direction-finding and jamming of communications signals. The system uses an AN/GLR-9 intercept receiver and an AN/TLQ-17A(V)2 jammer. When deployed together on an airframe, the system is called an AN/ALQ-151.

There are currently 20 systems of the original QUICK FIX deployed throughout the Army in EH-1H Hueys. The production contract for the QUICK FIX II mounted in an EH-60 Black Hawk was awarded to Tracor Aerospace recently with first delivery scheduled for mid fiscal year 1987. SWL supported PM SEMA throughout the fielding of this system.

SWL also has recently fielded five additional EW systems that are ground oriented. The EW family of systems being developed by SWL ranges from high-power, automated, multisignal jammers to low-cost expendable jammers that allow commanders to disrupt target areas not accessible to conventional line-of-sight jammers.

In addition, SWL has been designated by the National Security Agency as the lead laboratory to develop and field a triservice rear echelon high frequency communication intelligence system.

The combined contributions of EWL and SWL are of critical importance to Army Aviation operations of the future. Working together, they are ensuring that Army aviators will be able to employ their offensive weapons effectively in an EW environment and concurrently enhance their survivability on the integrated battlefield.

Previous articles in this series provide an introduction to the AH-64 combat mission simulator (CMS). Part I, in March 1985, discusses the battleground and looks at terrain design, the airfield area and the tactical operations area. Part II, in April 1985, examines the Apache model and the level of fidelity incorporated in the aircraft systems simulation. In May 1985, Part III covers the modeling and programing of the threat force that Apache crewmembers will face while undergoing combat skills training in the CMS. Part IV addresses CMS instructional features. Copies of these articles can be obtained by writing to Editor, *Aviation Digest*, P.O. Box 699, Ft. Rucker, AL 36362-5000 or by calling AUTOVON 558-6680; FTS 533-6680. Watch for Part V, "The Future," in an upcoming issue.

# Part IV: Instructional Features

THE HISTORY of flight simulation has been characterized by almost constant advances in the capabilities and complexity of flight training devices. Most of these advances have involved increased fidelity of simulation. That is, simulator design has emphasized physical correspondence between the device and the aircraft simulated. As a result, flight simulators increasingly look, feel, sound and perform more and more like the aircraft they simulate.

The increased appetite for high-fidelity simulators has been closely paralleled by the increased cost to procure and operate them. In spite of such costs, however, fidelity in the flight simulators is widely acclaimed as useful and, in many cases, essential to effective training. Because of the cost of high-fidelity devices, the development of simulator designs that permit more efficient training is a necessary goal.

An efficiently designed simulator is a device with instructional features that permit the conduct of instructional activities in a relatively short period of time and with minimal effort. In designing the combat mission simulator (CMS), it was necessary to examine the role of the flight instructor in simulator training and the manner in which the simulator would be used in training. The role of the simulator flight instructor was defined and the instructor station—the locus of control for instructional features—was built to complement the instructor role.

The CMS instructor station is located to the rear of, and mounted on the same motion platform with, each trainee station (pilot and copilot gunner). The instructor seat is almost directly behind the trainee seat. All of the controls instructors use to manage the training process are located to their right and in front of them as they face forward. Directly above the instructor's right console are three cathode ray tubes (CRTs), two video monitors and one data graphics display. One of

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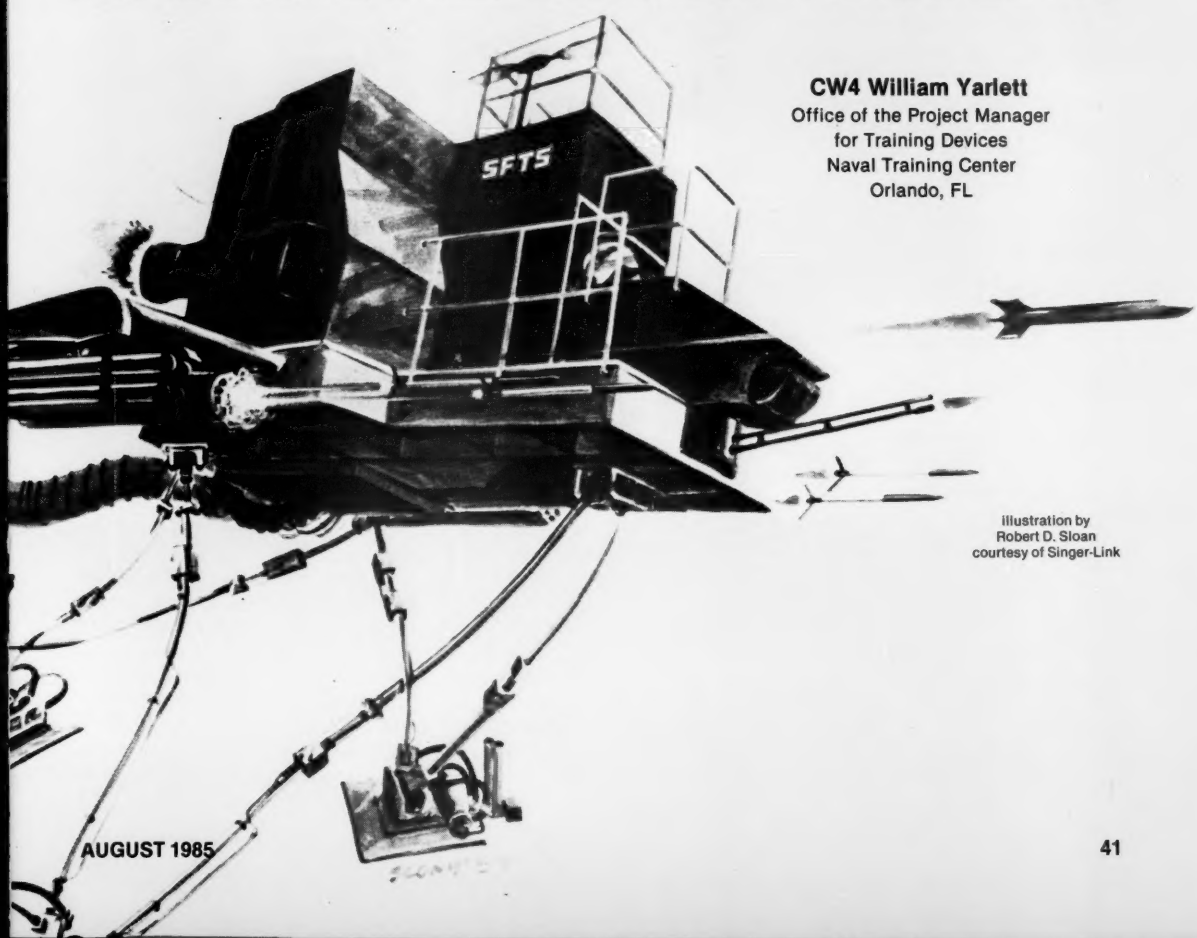
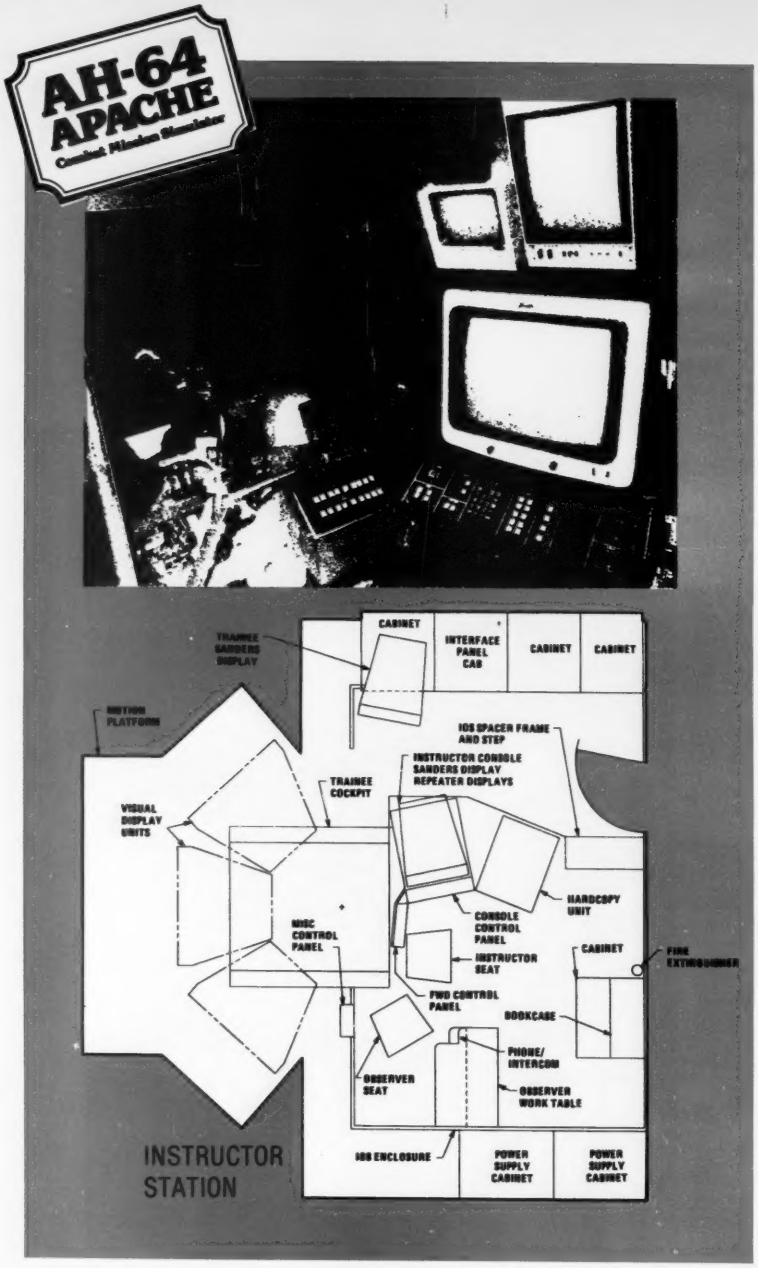



Illustration by
Robert D. Sloan
courtesy of Singer-Link



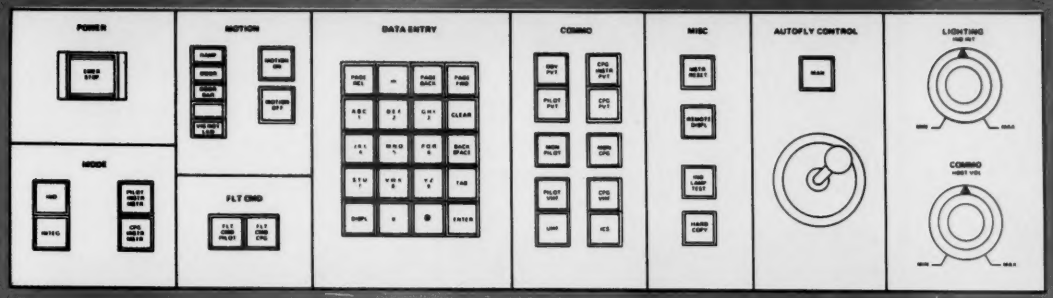

the two monitors provides color video for viewing out-the-window scenes and direct-view-optics. The other, a monochrome monitor, provides black and white video displaying either the pilot night vision sensor forward looking infrared (FLIR), the target acquisition designation system FLIR or day TV.

Instructors also have an Integrated Helmet and Display Sighting System Helmet Display unit repeater CRT which permits them to view students and their video outputs simultaneously. A hardcopy printer next to the control console prints copies of the data graphics CRT page displays selected by the instructor during the training period. With the exception of a few discrete functions (i.e., motion ON/OFF, freeze, playback) most instructor control inputs are made via a back-lighted data entry keypad similar to that found in the AH-64 Apache.

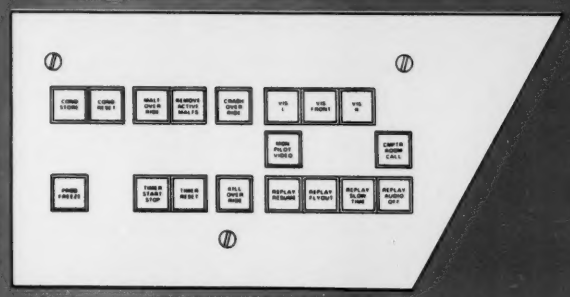
To the left of the instructor is a track-mounted observer seat. It provides a view of both the trainee station and the instructor console area and is ideally suited for instructor training or for use by flight training supervisors.

The AH-64 CMS is a full combat mission simulator with an instructor station designed to provide Apache instructors with the capability to teach attack helicopter employment and tactics. A number of instructional features were developed to assist the instructors in providing this training. They are simulator design considerations that enhance the efficiency and effectiveness of the instructional process. Some of the features provide instructors with training capabilities that simply do not exist in a real aircraft. They make the CMS, in effect, a learning laboratory and an environment more conducive to learning than the aircraft itself. For flight instructors to make use of the full potential of the CMS, they must know the functions of these features, how to control them and when and how they are best used.

Several of the CMS instructional features have been employed in other helicopter simulators and are tried and proven. They include initial condition sets, a current conditions page, cross-country map displays with aircraft plots, automated ground controlled approach programs, automated demonstration programs, systems failures and malfunctions, manual and automatic freeze, and record/playback




CPG INSTRUCTOR CONSOLE CONTROL PANEL



CPG INSTRUCTOR FORWARD CONTROL PANEL

functions and settable programs.

On request, the instructor's CRT displays a series of maps, which provide the instructors with feedback on current performance and activities. The CRT also includes a continuously displayed current simulator status which lists mission elapsed time, aircraft flight data, rotor speed and engine data, active malfunctions, weapons load and status, communications radio frequencies tuned and in use, and a threat activity indicator.

Ever-advancing increases in technology have made it possible to provide several new instructional features in the CMS. These include:

**Automatic Flight.** When instructors are operating the copilot gunnery cockpit (CPG) in the independent training mode, a set of preprogramed recorded flight profiles, up to 15 minutes each, permit CPG trainees to practice gunnery tasks while the computer flies the aircraft. Instructors have the capability to manually override the computer controlled program while the simulator is hovering, and from their console, control altitude and heading for the gunner, a pseudo-manual override of the recorded flight. When ready to continue, instructors simply return aircraft control to the computer.

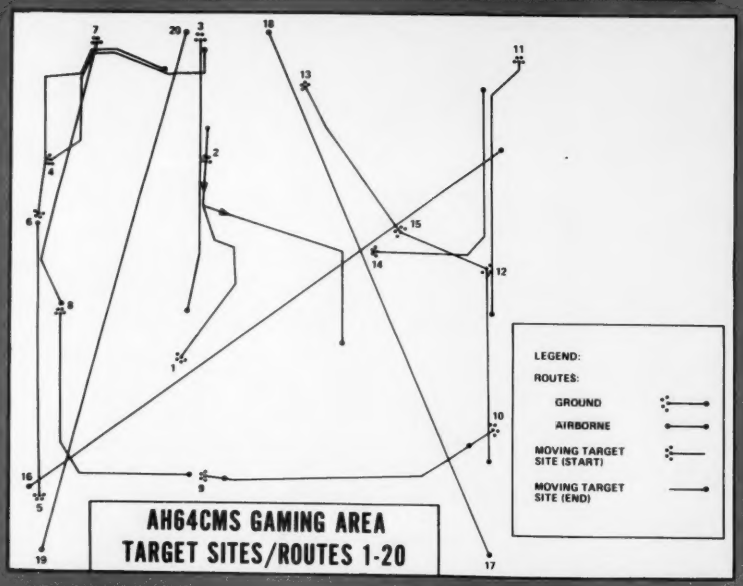
**Automatic Malfunction Insertion (AMI).** The AMI is an instructional feature that automatically inserts into the simulation up to 15 preprogramed AMI sets with as many as 10 malfunctions in each set. The preprogramed conditions that trigger malfunction insertion include engine revolutions per minute, aircraft altitude, indicated airspeed, firing onboard weapons and mission elapsed time. When a malfunction is about to be triggered, instructors are cued by a flashing alert message on the CRT. They then have 10 seconds to depress the malfunction override control if they choose, otherwise the failure will occur at the elapsed time.

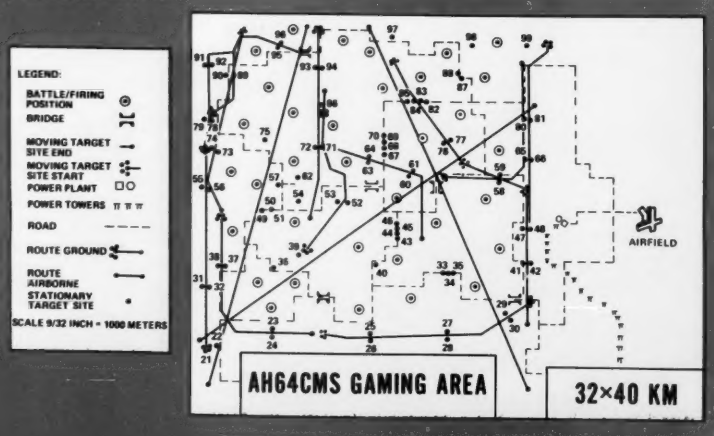
**Engagement Performance.** Engagement performance is a feature that records the trainees' performances while engaging a threat target. The feature automatically records the last four target engagements. Instructors can display the engagement performance data on the CRT or make hardcopies for later use. The performance data automatically recorded by the computer includes the crewmember that fired, the weapon fired, the target engaged, the number of rounds fired, hit or miss statistics, aircraft flight data and several other items to assist in analyzing trainee performance.

**Threat Weapons Scoring.** This feature automatically records threat performance data. Since the threat is programed to perform with real weapons' characteristics, it will do so when it detects the

# AH-64 APACHE
Combat Mission Simulator

COMPUTER GENERATED IMAGE



ownship (trainees' AH-64). Threat performance data is recorded and available for CRT display or hardcopy. Threat acquisitions are events that are indicated in the status area and are always available on the instructor's CRT and on CRT map displays. The type data made available to instructors includes the type of threat weapon and its location, elapsed time line-of-sight is maintained, range to the Apache, AH-64 height above mask, meteorological visibility, Apache use of terrain backdrop, status of Apache aircraft survivability equipment, probabilities of threat acquisition and hit against the Apache, engagement time, hit/miss on ownship, and threat rounds remaining. The data will tell instructors what tactical errors the Apache crewmembers made that permitted the threat to acquire and engage the AH-64.

**Target Engagement Exercise (TEE).** The TEE feature provides instructors the means to deploy a threat array to preprogramed locations (target sites) in the tactical gaming area. It determines which targets will shoot at the ownship and if they hit it, what damage (malfunctions) will occur. A TEE permits deployment of up to 10 targets at a time. There are 20 preprogramed TEEs available to instructors. Only one TEE may be active at a time, but they may be called up any time during a training period. By selectively calling up TEEs instructors may coordinate a running battle for the Apache crewmembers and enable them to engage an infinite number of targets during a training period.

**Store/Reset.** The store/reset feature enables instructors to return the simulated aircraft to a point in the data base that they previously elected to save. Whenever the store switch is depressed, a snapshot of the current conditions is made by the computer and the parameters at that time are saved. Depressing reset will return the simulator to that set of conditions. By depressing store prior to an engagement exercise, if not satisfied with the way the battle progresses, instructors can decide to depress freeze, reenter the required TEE, depress reset and begin the engagement over again.

**Remote Display.** The remote display is a datagraphics CRT placed over the right shoulder of the trainees. This enables them to view data from the instructor's CRT when they turn their heads to view the display. The feature facilitates briefings, debriefings and trainee performance examination during a training period. The CRT is located outside the trainee's normal viewing envelope and only displays data or graphics during freeze conditions.

**Target Control.** With the target control feature, instructors can manually build or establish a specific type target array to meet a particular training requirement. This is particularly useful when a TEE is not available to meet a peculiar need. As many as 10 targets may be selectively placed in the tactical gaming area.

**Target Evaluation.** Using the target evaluation feature, instructors can rapidly position the simulated aircraft throughout the gaming area to any universal transverse mercator grid, heading and altitude they choose to view the threat array. The feature enables examination of the tactical setting without threat weapons paying any attention to engagement of the ownship. It is particularly useful during instructor training to familiarize them with both the gaming area physical arrangement and with the target arrays associated with the 20 TEEs.

For each instructional feature made to support training periods, there are also features that permit training developers to construct or prepare the automated features. Demonstrations, automatic malfunction insertions, TEEs and automatic flight programs are all "burned in" before delivery of the CMS and can only be changed by the Army during periodic updates. Preparation programs permit the construction of automatic programs enabling them to be modified or rebuilt from scratch.

**Target Sites.** Additional instructional features enable the selection and control of 99 surveyed target sites. Seventy-nine of these are fixed (nontraveling) single target site locations. Five are single target sites with helicopter only targets. When selected and enabled, the helicopters will fly across the data base on predetermined routes and altitudes. The remaining 15 are moving/traveling target sites, each of which can accommodate up to 5 targets. Each target moves along an individual path in attack formation for distances up to 15 kilometers in lengths. Ten target sites may be occupied at any one time. There are 15 types of threat targets to place at these sites. For example, any 10 T-80 tanks, T-62 tanks, ZSU-23-4 self-propelled automatic antiaircraft guns, BMP Russian infantry combat vehicles, SA-4, SA-6, SA-8 or SA-9 surface-to-air missiles, BRDM armored reconnaissance vehicles, Hind D or Hip helicopters, or trucks may be selected and placed on target sites at one time or selectively mixed and placed on target sites. All target types with radar and/or weapons (except helicopters) are capable of engaging the Apache.

In summary, the CMS is the first simulator to employ an interactive threat. It will provide a formidable challenge to both trainees and experienced attack helicopter crews. The instructor station is designed with the most recent state-of-the-art training aids available to complement the first ever combat skills flight simulator.

With the Apache, we have the edge on the battlefield. With the CMS, we will be able to train to fight and survive—Train to Kill—or Be Killed.

Warrant Officer John Robinson
Warrant Officer Greg Reese
Headquarters, Headquarters Detachment
210th Combat Aviation Detachment
APO Miami 43006

Gentlemen:

Recently you wrote a letter to the *Army Aviation Digest* editor, commenting on the Action Line article, "VHIRP to be Clarified," published in the March 1985 issue. We requested the *Aviation Digest* editor to permit us to answer your letter, since it is evident we have not accomplished our goal, that of clarifying VHIRP (vertical helicopter instrument flight rules procedure).

The fact that VHIRP is much misunderstood and misapplied is well known. You have only to read *Flightfax*, the *Army Aviation Digest* or listen to a group of Army aviators discuss this subject to realize how much it really is misunderstood and misapplied.

Not fully understanding when or how to use the local VHIRP procedure can be hazardous to your health. We at USAATCA-ASO are attempting to clarify the VHIRP so that it will possibly save lives; not create a situation that could lead to an aircraft accident.

As the principal developer of the VHIRP we were concerned to the point where we tabled the issue at the 1984 Army Aviation Policy Committee Meeting. It was evident at this meeting that VHIRP misunderstanding was widespread; however, it was determined that the procedure served a useful purpose and should be retained. The committee then charged USAATCA-ASO to clarify the issue. The Action Line article was the initial step. Other articles are scheduled for publication; handouts have been prepared for the Aviation commanders' course; AR 95-50 has been revised to incorporate VHIRP requirements in detail; and VHIRP will be discussed at all meetings and seminars conducted by this office.

Now to respond to some of the specific points in your letter:

**Nonstandard Operating Procedures.** A VHIRP is a nonstandard operating procedure. There is nothing standard about it. It is a unique procedure designed specifically to accommodate Army tactical terrain flight training in specifically designated areas during times when instrument meteorological condition (IMC) *may* be encountered. Please note that neither the Army nor the Federal Aviation Administration (FAA) wish to encourage inadvertent IMC. Each VHIRP is designed on a case-by-case basis to fit the peculiarities of a particular geographical area, the available airspace, how the Army aircraft are equipped, the density of civil air traffic, the recovery fix, the recovery airfield and other variable factors.

**Transponder Code.** The transponder code setting may or may not be the emergency code 7700. The Letter of Procedure (LOP) between the using agency and the air traffic control (ATC) facility will specify the code setting. If 7700 is selected, it is usually because another code setting is determined to be inappropriate. When a VHIRP is activated the ATC facility will assume that this is not a real emergency since the transponder signal will be coming from the tactical terrain flight training area, the recovery fix or somewhere between the two.

**Emergency.** A VHIRP is not an emergency procedure since it is preplanned. From the moment IMC is encountered the helicopter is considered, by the ATC facility, to be on an instrument flight rules (IFR) flight plan. Activated VHIRP airspace will be sterilized from other IFR traffic to create a safe IMC environment for our helicopters to return home. This procedure, when activated according to the LOP, constitutes a waiver to the Federal Aviation Regulations (FARs) and the pilot will not receive a flight violation. Military pilots who deviate from the FARs, unless they do so according to a waiver, exemption, or in those instances when the FARs do not apply to them, are subject to receive a flight violation even if they are experiencing a real emergency.

**Public Law 85-726.** This is the act that created the Federal Aviation Agency—(later changed to the Federal Aviation Administration and brought under the Department of Transportation in 1966 by Public Law 89-670). These acts do not imply that military pilots are relieved from complying with the FARs. (See **enclosure 1,** an extraction from the FAA Act of 1958.) Public law 85-726 does not contain a "loop hole" that will apply to your "NON-SOP." The "military authority" mentioned in the FAA Act of 1958 refers to a much higher military authority.

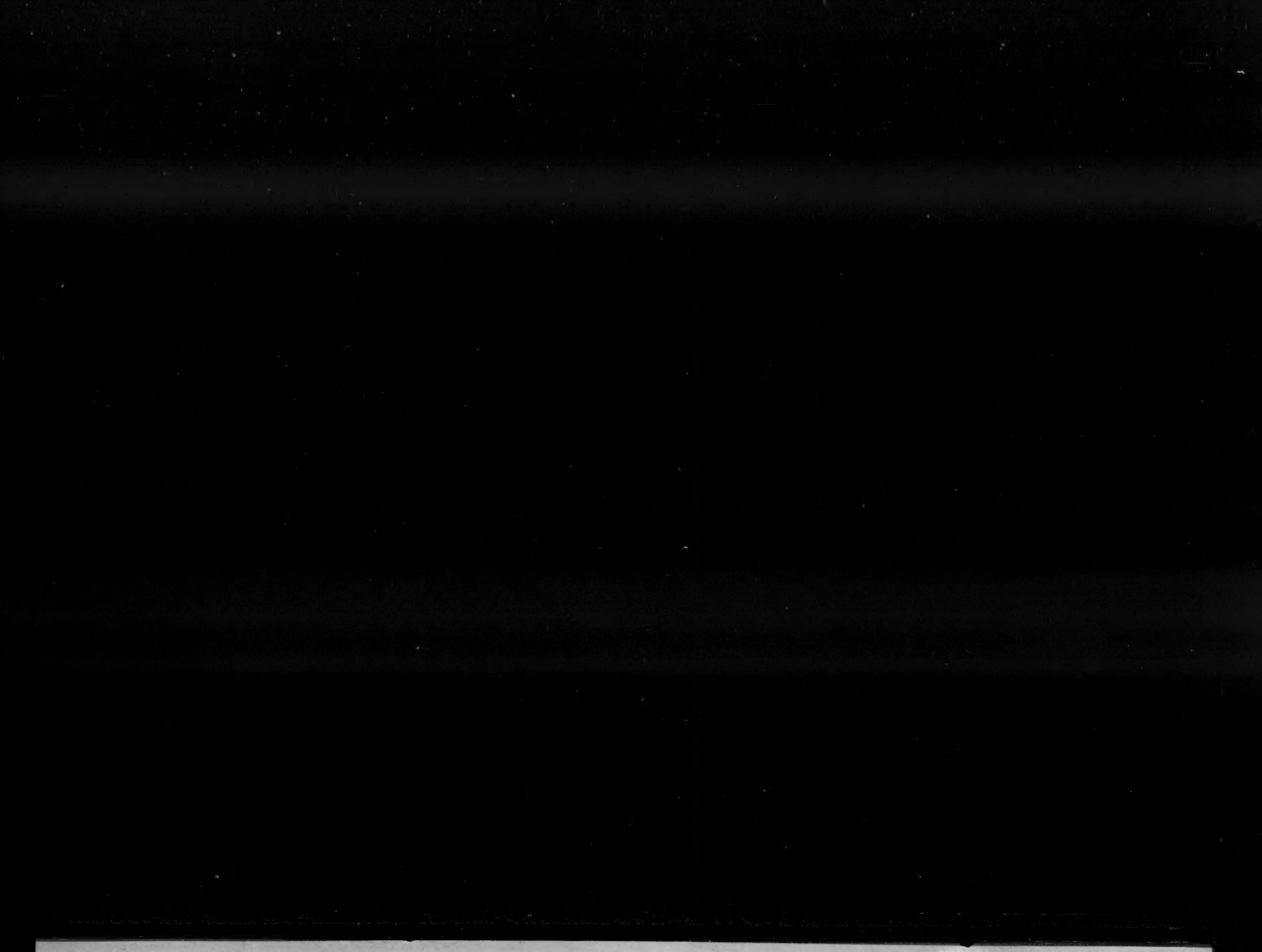
Three additional enclosures are provided in the hope that they will help clarify VHIRP for you:

**Enclosure 2** is a copy of the VHIRP handout provided to the students attending the Aviation Command Course. It is intended to help new Aviation commanders understand the reason behind a VHIRP and how to go about establishing one if it is required. If it misses the mark, we solicit your constructive comments.

**Enclosure 3** is the Department of Army letter that established the program. Hopefully, it will provide the background for the VHIRP.

**Enclosure 4** is the actual FAA Order that outlines procedures for local FAA facilities to use and follow when assisting local military authorities in establishing a VHIRP.

As indicated in the March 1985 *Aviation Digest* Action Line article, VHIRP is much misunderstood and your letter tends to confirm our suspicion here at the Aeronautical Services Office. We hope that the enclosed package clears up your questions and concerns about VHIRP. If not, let's continue the dialogue. We are open to any and all suggestions on how to provide a simple, clear explanation that all aviators, of all experience levels, all over the world will understand.

Colonel John J. Berner
U.S. Army Air Traffic Control Activity
Aeronautical Services Office
Cameron Station, Alexandria, VA 22304-5050

Editor's note: Copies of the enclosures mentioned in this letter can be obtained by writing to: Director, USAATCA Aeronautical Services Office, Cameron Station, Alexandria, VA 22304-5050, or by calling Mr. Jesse M. Burch Jr. at AUTOVON 284-7796/6304 or commercial (202) 274-7796/6304.